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Malignant Catarrhal Fever

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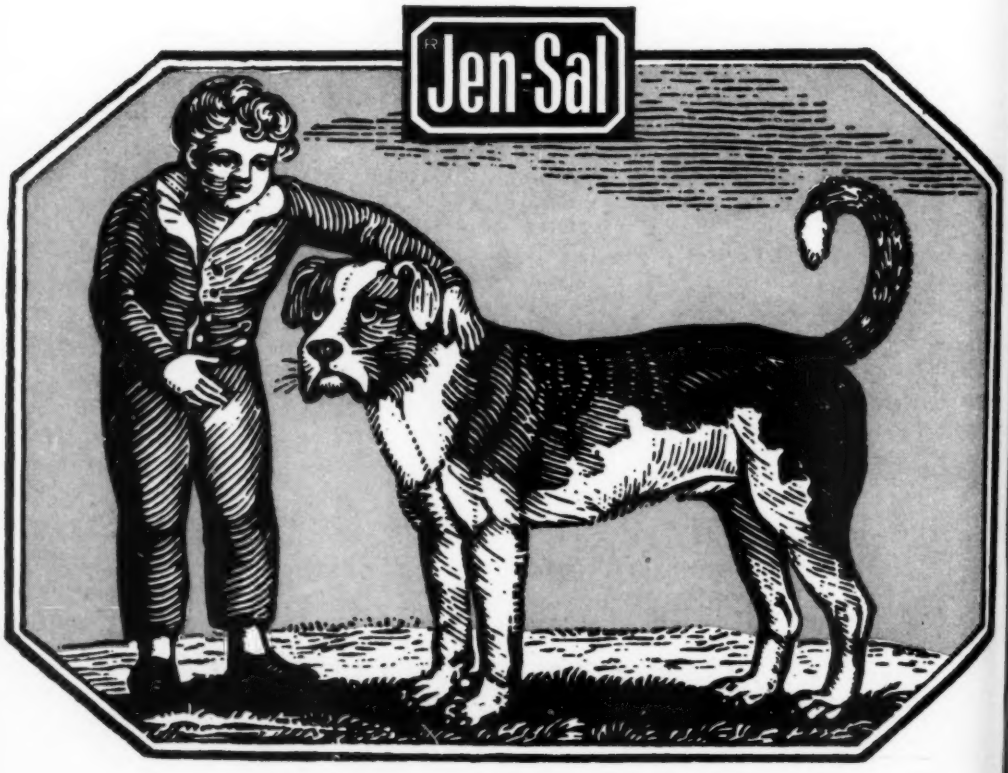

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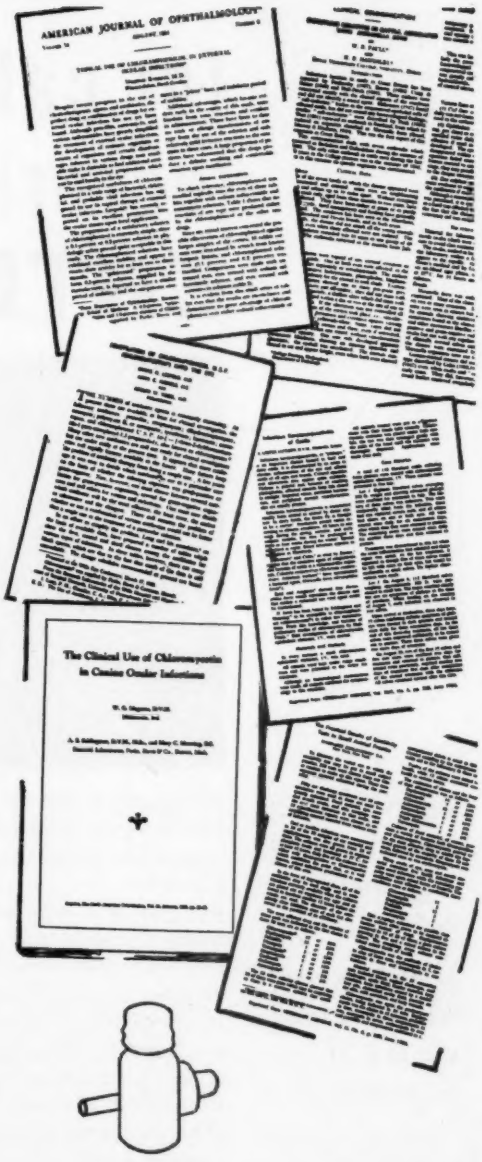

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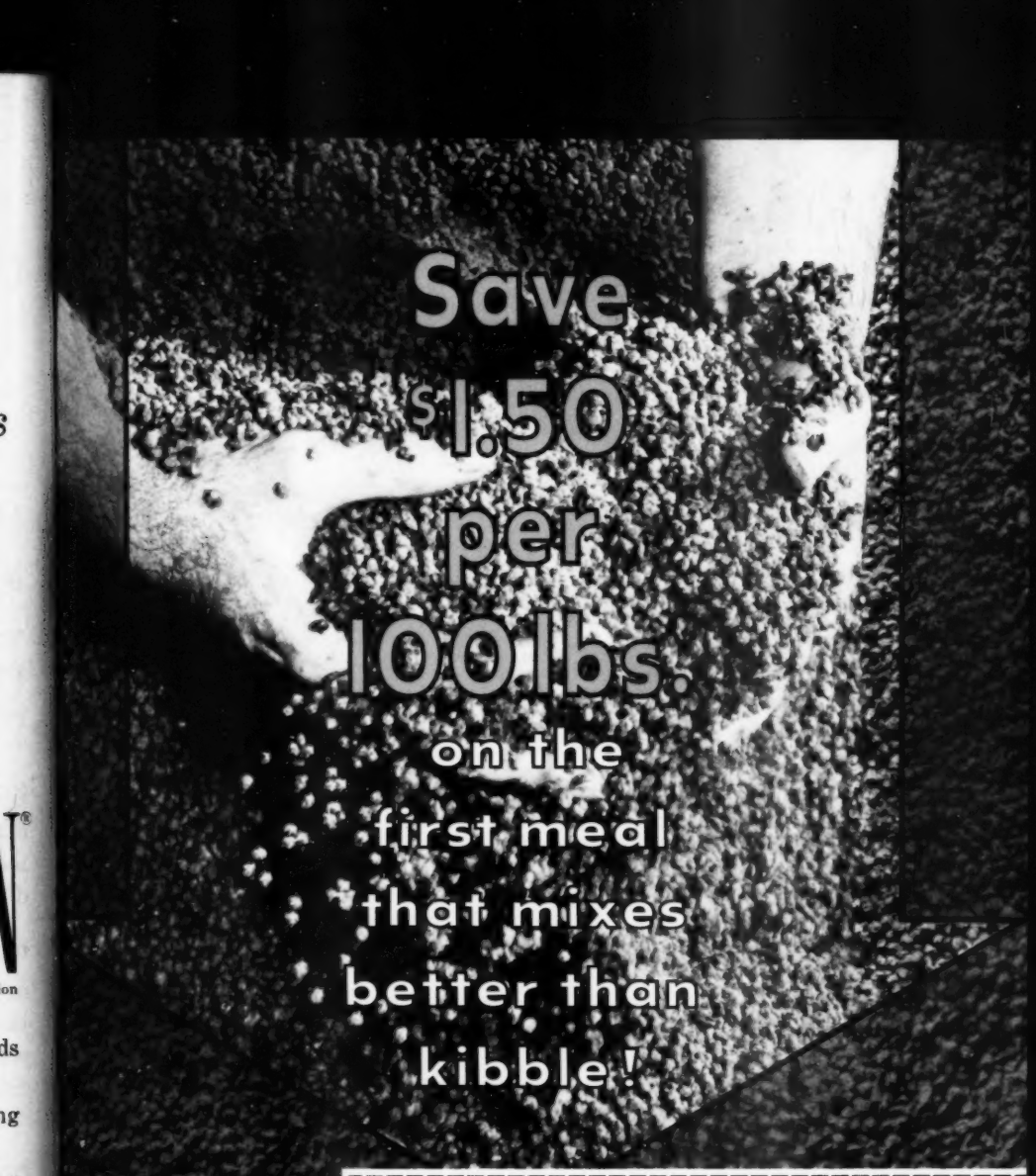

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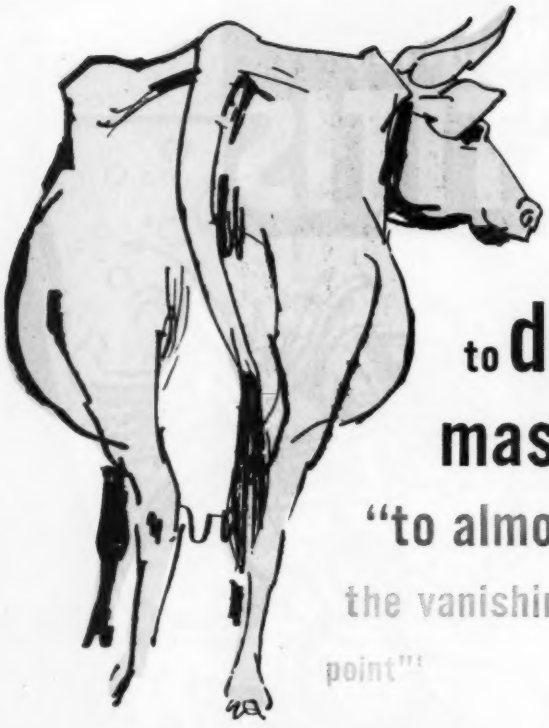

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Teat Injuries

CLEANLINESS is the most important part of any treatment for teat injuries, since dirt is full of germs. Then a teat can be considered as a tube, and germs that get into it can easily ascend into the udder to cause mastitis. Accordingly, the first step in treatment consists of cleaning up the wound.

Warm water containing a mild antiseptic can be used, or hydrogen peroxide can be applied after the wound has been washed out with the antiseptic solution. A few pinches of cotton will be handy for gentle swabbing of the injury. Strong disinfectants like lysol aren't recommended for open wounds because they have a tendency to destroy tissues. After the wound has been cleaned, it can be blotted dry with cotton or new strainer pads. The next step will depend on the type of wound.

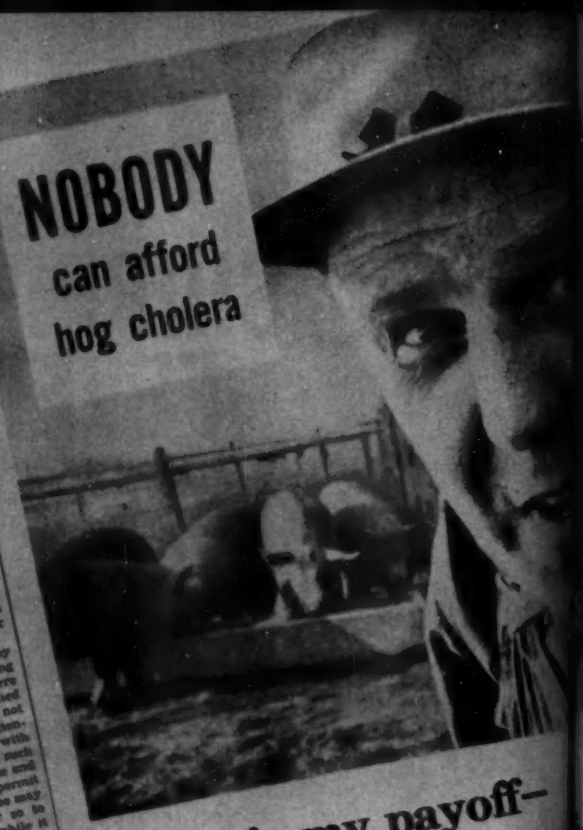
When teats are cut on the sides without the milk duct being opened, treatment is concerned with bringing the wound edges together so healing will occur faster. Bad cases may call for the services of a veterinarian to close the cut with stitches or metal clips made especially for this purpose.

Simpler cases may be treated by the owner, with wound edges being pinched together and then held there by strips of adhesive tape applied around the teat. Minor cuts may not require bandaging, but more extensive ones should be covered with gauze under adhesive tape. In such cases, it's important to leave the end of the teat uncovered to permit milking. The use of a milk tube may be indicated for a week or so to avoid squeezing of the teat while it is healing. As an alternative, a special type of plastic tube may be inserted in the teat. This is left in the teat all during the healing period, with a cap being uncovered at milking time to drain out the milk. Mastitis ointments should be injected into the quarter every day during the healing period.

WHEN the end of the teat is injured and part of it is left dangling, it will usually be best to clip it off. The teat may leak milk for a while, but it will probably be about as good as ever by the next freshening time. In such cases, gauze may be folded into a small square to cover the wound, and held in place by two strips of tape laid across it at right angles to each other with the ends running up the sides of the teat. The bandage can be removed for milking by wetting the tape, and a new one applied afterward. Mastitis ointments can be applied to the raw surfaces every day to aid healing.

When the cut cuts open the milk duct, a veterinarian should be consulted. This is because the treatment of these injuries begins with closing the duct with stitches at the bottom, and then closing the teat over it with additional stitches. Otherwise, an open teat duct usually means losing milk at each milking until healing has progressed. Also, the duct will heal improperly, unless the wound is sutured, and mastitis may be encountered.

While teats aren't actually complicated, they often result in a lot of trouble, they often result in a lot of milk can't be drawn out of the quarter. Milk tubes or the special plastic tubes mentioned earlier are often used for this type of injury.



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News Comment

Oral Polio Vaccine

Experimental production and further development of the Sabin oral polio vaccine is in the wind at Merck & Company, Rahway, New Jersey. In announcing the firm's decision to go into large-scale production of Sabin vaccine, John T. Connor, president of Merck said: ". . . it will be sometime in 1961 before a live virus polio vaccine will be proved safe and effective and will be ready for distribution to the public."

Dr. Albert Sabin of the University of Cincinnati Medical School produced the live virus vaccine used in clinical trials, results of which were recently revealed to the World Health Organization and the Pan American Health Organization.

Keogh-Simpson Measure

Keogh-Simpson, after a bad time in two congressional sessions, will probably break out of committee—next year. Congress wants to go home and will quite likely pass up the chance to give veterinarians and other self-employed persons a tax break on money paid into retirement plans.

The administration charges that the measure would cost the treasury $365 million the first year, and billions over a period of time. Dr. Roger Murray, Columbia University economist, insists, however, that the first year's cost would be in the area of $75-$100 million. The House passed the bill several months ago. A bitter fight in the Senate will probably shelve the bill.

Multi-Company Deal

Anchor Serum Company, which operates several subsidiaries, including Research Laboratories, Peters Serum Company, Wilke Laboratories, Peerless Serum Company, Pets' Best Company, Medical Industries, Certified Laboratories and World Health Institute, figured recently in a

multi-company consolidation and merger uniting Anchor with companies in electronics, transportation and public utilities. A new organization has been formed to conduct activities in the area of fine chemicals, drugs and pharmaceuticals. The firms with which Anchor is uniting are financially associated with North American Philips, Inc.

Milking Time Reduced

Four basic steps can make possible reduction of milking time in half, according to Dr. William Petersen, University of Minnesota dairy cattle scientist. Steps outlined are as follows: (1) Massage teats and udder to stimulate milk let-down; (2) start milking one minute later; (3) don't let teat cups crawl; (4) strip by machine.

To Develop Veterinary Products Line

Appointment of Lee Gibson, former vice president of Lakeside Laboratories, as vice president in charge of pharmaceuticals and drug operations at Wander Company, Chicago, has signaled expansion of the firm's Smith-Dorsey Division and Anca Pharmaceuticals in Canada. Expansion plans center around the development of a veterinary products line, according to Drug Trade News report.

Vaccinate for Mastitis

University of New Hampshire scientists believe that in 160 cows, staphylococcus toxoid prevented spread of the infection in vaccinated animals. This approach to a knotty problem has been considered for many years. Increasing seriousness of the problem has stimulated controlled studies and evaluations in several research facilities.

In the New Hampshire experiment, toxoid decreased the number of acute flare-ups in infected cows for periods up to 18 months. Two groups of cows were used in separate barns. Both groups had about the same percentage of Staphylococcus mastitis. Of 40 in one barn, 16 were vaccinated with experimental toxoid and 15 with a commercial toxoid, with nine left as controls. Of the 60 housed in a second barn, records on 30 throughout the 18 months test period served as additional controls.

Before vaccination, the 31 test cows showed 16% of their 124 quarters infected. The control group of nine cows in the same barn showed 16.6% infected at the beginning of the test and 50% at the end of the 18 month trial. Only 17 of the 31 vaccinates experienced acute infections during the trial compared to the 33 cases in the nine unvaccinated cows in the same barn. In the second barn there were 46 acute cases in the 30 control animals. Quarters with well established chronic infections cannot be expected to clear up with vaccination.

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Once, there was this D.V.M. (a competent practitioner, but he had his problems). His patients hated him because when antibiotics were indicated, he'd pop four pills down their throats. Also, he had to rent a big office (which he couldn't afford) to store all the pills.

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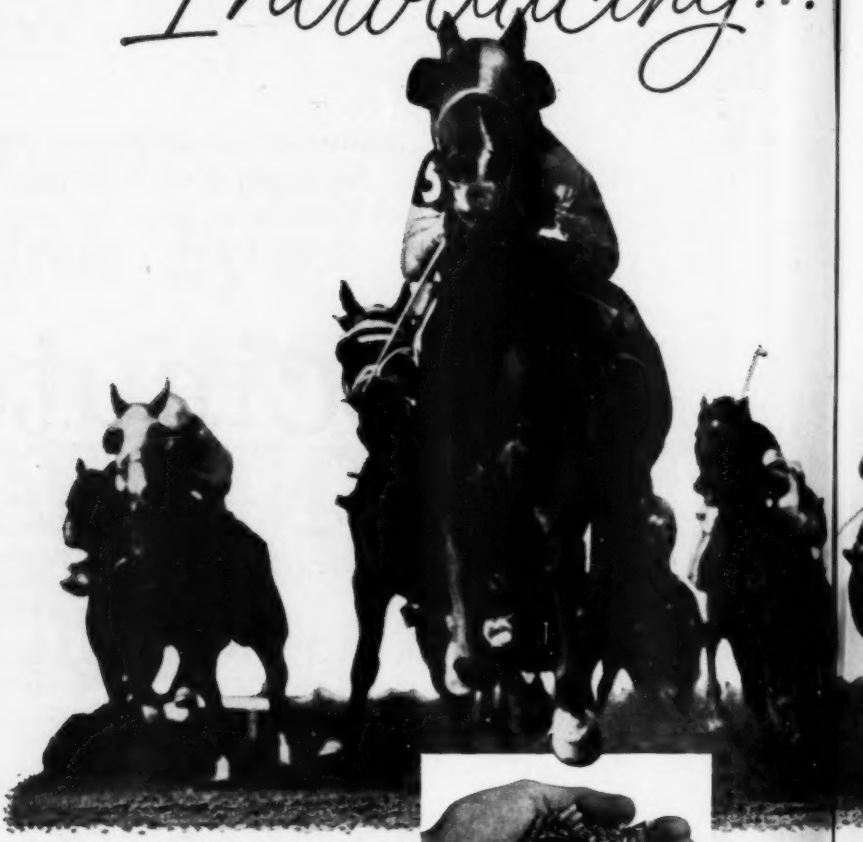

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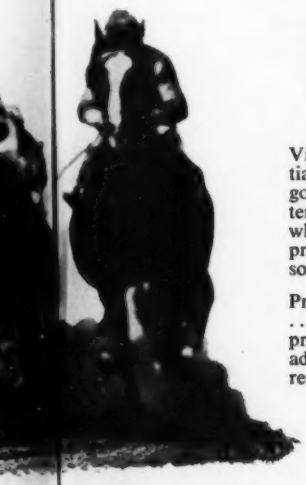

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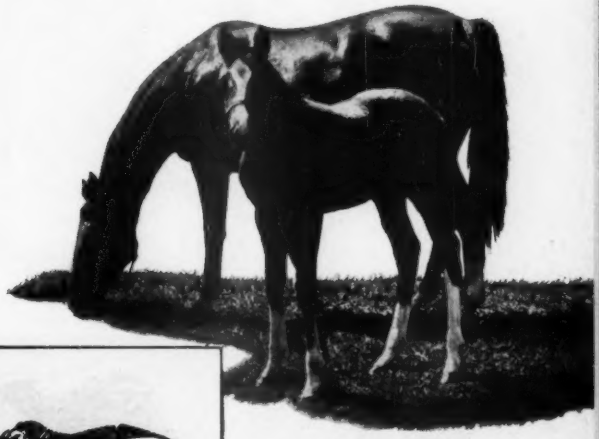

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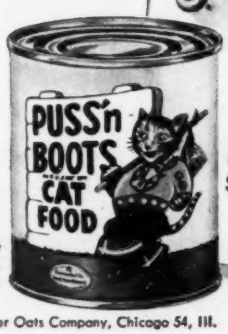

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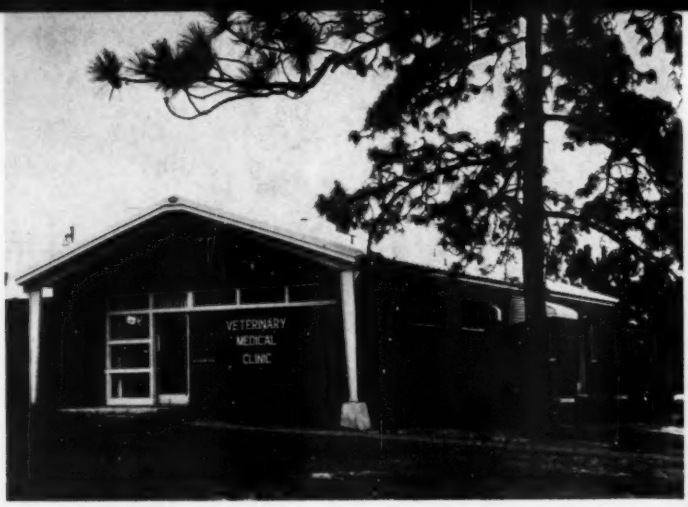
THE PRE-ENGINEERED CLINIC

THE CHANGING CHARACTER of modern veterinary medicine has placed great emphasis on variety of services. Other considerations have pointed up the advantages of group practice. Laboratory diagnosis, surgery and convenience for the professional staff are but a few of the reasons for the rapidly expanding interest in group practice. At the same time, group practice requires good physical facilities with which to render the type of service expected of veterinary practitioners.

New practice facilities have done much to increase the status of the profession. A continuing need for even better facilities is an anomaly of veterinary practice in modern society.

Investment in a clinic involves a substantial personal investment on the part of the veterinarian. It also requires faith in the community, the individual himself and the profession. In the past, many practitioners have worked hard and long to accumulate the funds necessary to acquire suitable practice facilities. Understandably, many have been reluctant to invest their total life savings in a new clinic facility at a time when they themselves have reached the mid-point or declining years of a practice career. The attraction of other income producing investments is understandable at this point. On the other hand, a growing profession desperately needs the investments of its members in order to serve the increas-



This is the Blalock Veterinary Clinic at Augusta, Georgia. The building is rigid frame, 28 ft. x 40 ft. x 10 ft.

ingly complex demands of a free enterprise society.

The obvious merit of enthusiastic young veterinarians being able to serve their clients from good facilities warrants study. Mounting building costs, land values, and the unusual architectural demands of veterinary facilities complicate the problem in the extreme.

A mushrooming trend now evident in the American construction industry suggests a possible lead for dealing with this problem. Increased acceptance of pre-engineered metal buildings has helped preserve the budget for schools, factories, civic buildings, churches and commercial offices.

The same concept may prove useful for veterinarians. Advantages of this type of construction for veterinary clinics are that it is no longer necessary to have a large amount of money on hand to build a conventional veterinary hospital or clinic. Today the practitioner can quickly and economically obtain an attractive, functional building for the establishment of his practice almost as soon as he earns his degree.

According to a spokesman for Butler Manufacturing Company,* pre-engineered structures have proved ideal for the small business or professional man who is entering his field. At the same time, metal buildings afford established veterinarians the opportunity of obtaining, economically, more spacious and useful surroundings.

*Located at 7400 East 13th Street, Kansas City 26, Missouri.

In electing to build today, the veterinarian does not have to worry about the amount of space he may need five or ten years from now. Metal buildings are easily expansible, such expansion being possible without interrupting practice. The curtain wall, which can be moved and reinstalled without loss of materials, makes expansion both simple and economical. The clear-span interior also affords maximum use of unobstructed interior space. The veterinarian can set up practice in adequate and attractive quarters, and then expand these facilities as his practice grows.

Other factors are attracting today's professional men to metal buildings. Such structures no longer are "tin sheds" or "architectural monstrosities." The clear-span rigid frame structural system permits use of attractive, non-load bearing walls and interior partitions of glass, masonry, wood or other conventional materials. Attractive steel and aluminum panels also are available for use as roof and sidewalls. Such panels are supplied by the factory in a choice of colors or can be painted at the construction site.

Fiberglass reinforced plastic panels are used extensively in the roof system to effect natural lighting. Colored plastic panels may add considerably to the interior decor of the building.

Aluminum-roofed and expertly insulated metal buildings are economically heated and cooled, and offer a maximum of fire-safety. The gable-type roof lends itself to natural ventilation. Coupled with a variety of accessory items, these features give the customer a wide choice of building designs.

Rapid erection of pre-engineered components, low maintenance cost, and the elimination of expensive custom engineering are economic factors adding to the increasing popularity of pre-engineered metal buildings. These metal buildings can be financed, much as one does the family car, the home or the washing machine. In fact, the manufacturer has a finance plan available for qualified building customers.—*Herb Kinkead.*

Posthitis of Sheep

In parts of Australia there is considerable non-contagious posthitis of sheep (*Australian Veterinarian,* March 1959). The condition is observed especially during those periods of the year when animals are grazed on native grass pasture, and even more when alfalfa is part of the pasture roughage. Ulceration of either internal or external portions of the prepuce is characteristic.

Fasting relieves most of the external posthitis, but with an undesired loss of weight and a relapse when returned to pasture. Internal posthitis responded best to surgical handling by either a ventral incision extending backward to the posterior limit of the prepuce, or the additional removal of a "U" shaped piece of the skin of the sheath.

Limited success followed the additional intramuscular use of procaine penicillin and topical application of a solution of copper sulphate.

"Twisted Tails"

A layman recently made an inquiry in which he sought information about "twisted tails," appearing as if some one had frequently twisted the animal's tail to make it move, and occurring in several of his calves at birth. We informed him that the condition was an inherited non-lethal trait and since he had observed it in several calves the sire was probably the carrier of the causative gene.

Other non-lethal traits that are not uncommon are the notable "white heifer disease" with a contracted vagina and a ballooned uterus so that conception is impossible; umbilical hernia in bull calves; extra or rudimentary teats, or sometimes fused teats; congenital cataract; hair defects; distorted limbs; notched and drooped ears; extra claws or digits and many others. We advised changing the herd sire, or if the condition is noticed only in the offspring of one sire, to eliminate him as a breeder.

Fig. 1. Diffuse intermandibular swelling.

Fig. 2. Deep depression 12 hours prior to death.

Bovine Intermandibular Cellulitis

THE CONDITION described by Frank[5] as *diffuse suppurative inflammation* and more commonly known as *Cellulitis* probably occurs more frequently than is indicated by reports in the literature.[3,5,7] The purpose of this paper is to summarize the results of a brief investigation of one case of this disease, including clinical signs, treatment, necropsy findings and attempts to reproduce the condition.

History

The subject was a five year old, 1,200-pound purebred Hereford brood cow that had freshened 30 days earlier. There was no record of sickness prior to this time.

On the evening of April 23, it was noticed she would not rise to permit her calf to nurse; only after urging did she get up and allow the calf to nurse. Nothing else abnormal about her appearance or actions was detected at that time.

At 5:00 a.m. the following morning, she was standing apart from the herd, head lowered, with a large conspicuous swelling under the jaw. When examined at 9:00 a.m., toxemia with complete anorexia, dyspnea, and deep depression were evident. Rectal temperature was 106 F. The head was held low, the eyes appeared dull, and saliva "drooled" from her mouth. The intermandibular space contained a large, firm, warm swelling extending from the mandibular symphysis to the larynx, and laterally to the rami of the mandible (figure 1). A diagnosis of "cellulitis" was made with an unfavorable prognosis.

Treatment consisted of 2 gm. chlortetracycline, 200,000 units streptokinase, 50,000 units streptodornase (plus human plasminogen), in 1,500 ml. of 20% dextrose, intravenously. A blood sample was taken for culture and cell counts. Hemoglobin was 9.5 gm. per 100 ml., erythrocytes numbered 5,890,000 and leukocytes 5,400, with 61% lymphocytes, 38% segmenters and 1% monocytes.

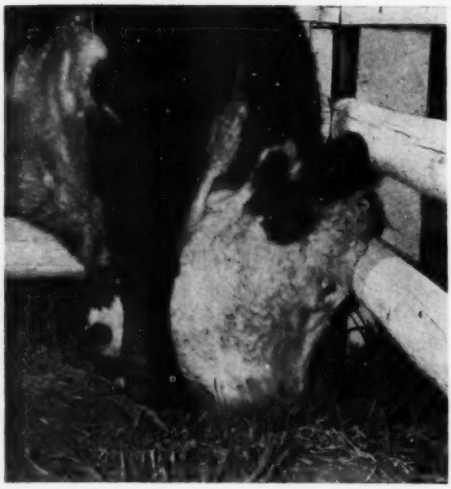


Fig. 3. Signs of central nervous system involvement.

A CASE REPORT

by

KENNETH D. WEIDE, D.V.M., M.S.
V. L. SANGER, D.V.M., M.S.
and N. A. FRANK, M.S.

Department of Veterinary Science
Ohio Agricultural Experiment Station
Wooster, Ohio

litis or Phlegmon

By 11:00 a.m. the cow exhibited central nervous system involvement. The head was lowered and she continuously wandered aimlessly about with an uneasy, anxious attitude and extreme depression (figure 2). Breathing was particularly difficult. She attempted to chew on gates and posts, and frequently pressed her head against objects (figure 3). By mid-day, extreme weakness and incoordination were evident. She fell and was unable to rise. At 3:30 p.m., no eye reflex could be provoked. Rectal temperature was still 106 F. Death occurred shortly before midnight.

Necropsy

The subcutaneous tissue in the intermandibular space was grossly edematous, hemorrhagic and dark in color. Numerous small yellowish focal abscesses were scattered throughout. This diffuse lesion extended from the symphysis of the mandible to the larynx with no evidence of localization. A greenish, serosanguineous fluid with a very strong fetid odor dripped from the cut surface. Careful examination of the mouth and head failed to reveal evidence of trauma or external wound.

The heart exhibited massive epicardial and endocardial hemorrhages, and the myocardium had a pale "cooked" appearance. The pleural surface of the diaphragm was covered with diffuse hemorrhage, and the entire lung surface was spotted with ecchymotic hemorrhages. Hemorrhage was also present under the splenic capsule; the parenchyma was soft, dark and pulpy. The liver was pale, friable, and exhibited yellow-white areas over the entire surface suggestive of areas of necrosis. The brain and gastrointestinal tract revealed no gross lesions. Kidneys were soft and pale with a strong uremic odor. The uterus contained a small amount of dark, tenacious exudate, and measured 18 in., including body and horns; each horn was approximately three inches in diameter.

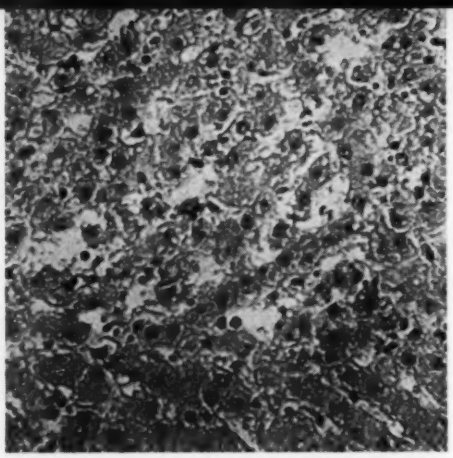


Fig. 4. Focal necrosis of liver. Hematoxylin and Eosin; x 122.

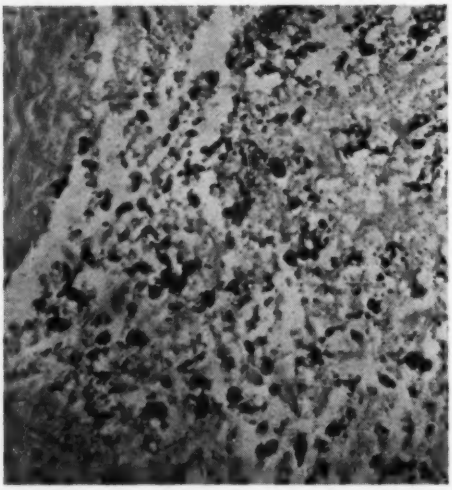
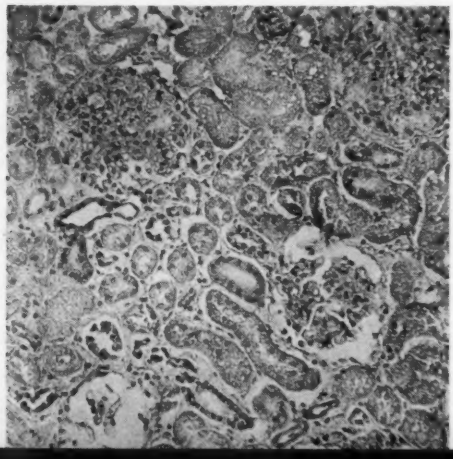


Fig. 5. Large amounts of hemosiderin in spleen. Iron stain; x 80.

Fig. 6. Degeneration of glomeruli, with extreme cloudy swelling of tubules. Hematoxylin and eosin; x 95.



Histopathological studies were made on the liver, heart, spleen, kidney, brain and the intermandibular lesion. The liver (figure 4) showed extensive albuminous and fatty degeneration with numerous areas of focal necrosis. Liver sinusoids were prominent, and contained many neutrophils and lymphocytes. In the heart, petechial and linear hemorrhages were present throughout the myocardium. Edema had caused separation of some muscle bundles. Splenic architecture was completely disrupted, making it difficult to differentiate red from white pulp, although a few very small germinal centers remained. Large amounts of hemosiderin (figure 5), some of it contained in macrophages, were present. Fibroblasts were numerous; erythrocytes, lymphocytes, macrophages, plasma cells and neutrophils were scattered throughout the disrupted tissue. Considerable eosinophilic debris was present.

In the kidney (figure 6), glomerular tufts were swollen and vacuolated. Bowman's spaces were clear, but the capsules were ruptured in some glomeruli. Other glomerular tufts were undergoing necrosis, as indicated by broken capillaries with only fragments of tissue remaining. In some glomeruli, the tuft was absent entirely. The distal and proximal convoluted tubules exhibited extreme cloudy swelling with complete closure of the lumen. Nuclei of the epithelial cells were invisible. Henle's loops were open, although many were broken. Separation of some tubules had occurred indicating interstitial edema.

In the cerebellum almost all Purkinje cells were absent and the granular layer was partially depleted of cells with only open weblike tissue remaining. The neurons of the medulla showed extensive degeneration characterized by rounded edges, shrinking and loss of nuclei.

Microscopic studies of the lesion (figure 7) revealed massive infiltration of fibrin in the subcutaneous tissue and between muscle bundles. This excessive fibrin had the appearance of wide bands of tissue distinct from the muscle and connective tissue. Neutrophils were caught in the fibrin and were present in large numbers between muscle fibers. Hemorrhage was extensive throughout and most vessels were packed with

blood. Numerous small foci of neutrophils surrounding necrotic centers were scattered throughout the tissue indicating early abscess formation. These foci were located in the interstitial and subcutaneous tissue but not in the muscle bundles.

Laboratory

The blood sample obtained at the time of treatment and fluid aspirated aseptically from the lesion at necropsy were cultured in dextrose broth, thiol media and on blood agar. No growth was obtained on blood agar from either source. No growth was observed in thiol from the blood sample; the thiol culture direct from the lesion was contaminated. Dextrose broth yielded a pure culture of cocci (figure 8) from both the blood and the lesion. The cocci were Gram positive, with a tendency toward diploid formation. The growth was sparse.

A broth culture of the organism was allowed to incubate 48 hours at 37 C and 5 ml. of this material was inoculated into the intermandibular region of a five month old, healthy calf. The culture was deposited both intramuscularly and subcutaneously. During ten days of observation, there were no changes except a one degree rise in temperature 24 hours following injection. Blood counts remained normal. No intermandibular lesion of any kind developed.

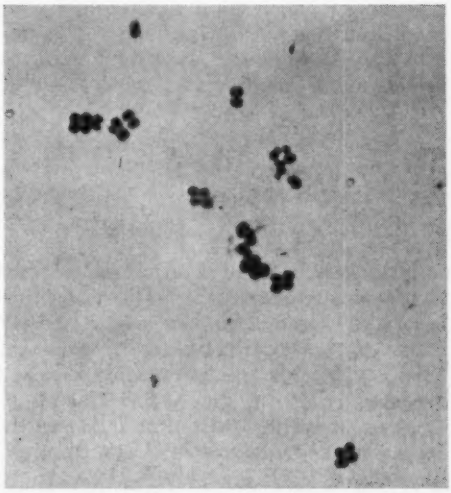
Since this condition has been observed only in adult animals,[2,3] two mature healthy dairy cows were inoculated with 10 ml. of a 48 hour culture of the organism. The culture was placed in the intermandibular area, both subcutaneously and intramuscularly. In an attempt to suppress tissue response to infection,[4] one of the cows was placed on cortisone acetate (1 mg. per pound of body weight daily) for three days beginning the day of inoculation. Observations were made for ten days. Blood studies as well as rectal temperatures failed to reveal significant changes. No intermandibular lesion developed.

Discussion

This condition appears to start from some point of infection and rapidly overwhelms the body defenses. There was no response to drugs. The course of the disease was so

Fig. 7. Infiltration of intermandibular area with fibrin, neutrophils and fluid. Hematoxylin and eosin; x 95.

Fig. 8. Pure cocci culture from both blood and lesion. Gram stain; x 1266.



rapidly fatal that only the early degenerative changes commonly associated with most acute, febrile diseases were found. Consequently, nothing of differential significance was found except the primary lesion. Cultures of the uterine exudate were unintentionally omitted and it is possible this may have been the source of the infection. Efforts to reproduce the disease with broth cultures of the coccus were unsuccessful, which suggests that a combination of factors were involved in establishing the disease. The calf which nursed the cow after acute signs appeared did not show any evidence of disease. The white cell count was at the lower limit of the accepted normal range for cattle.[1]

The condition could be confused with actinomycosis and actinobacillosis but differential signs included sudden onset, high fever, complete anorexia and extreme depression. Phlegmonous stomatitis[4] produces some similar signs, but the findings reported in this paper do not correspond completely with those reported for stomatitis.

Summary

Symptoms of a rapidly fatal, febrile, diffuse suppurative inflammation in the intermandibular region of a mature beef cow have been described. The course was approximately 30 hours. Treatment was unsuccessful. Bacteriological examination of the blood, and fluid from the lesion, revealed a Gram-positive coccus in pure culture, but attempts to reproduce the disease in healthy animals were unsuccessful.

Histopathological studies indicated that the spleen, liver, kidneys, and brain were most severely affected. The lesion itself was edematous and consisted of fibrinous and neutrophilic infiltration of the subcutaneous and muscular tissues.

No route of infection could be determined by examination of the head for trauma; metastatic infection from the uterus is possible, but can only be speculative. The "trigger mechanism" responsible for this overwhelming toxic infection was not determined. No cases were on record of a similar condition in this herd. The condition is easily differentiated from actinobacillosis and actinomycosis.

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Bovine Tuberculosis Campaign

A large-scale research campaign against tuberculosis in cattle will be launched this fall at Michigan State University. Initial grants of $245,000 for laboratory investigations and $65,000 for field studies were accepted July 17 by the M.S.U. Board of Trustees from the Agricultural Research Service of the United States Department of Agriculture.

The sum is one of the largest spent in recent years for a single animal disease research project.

Expected renewal of the field studies grant in 1960 and again in 1961 would bring the total cost to about $410,000 over a 3½ year period.

Michigan State University scientists hope to improve technics for detection of the disease, find better methods of growing the responsible bacteria in the laboratory and to study condemned cattle before they are killed.

Ten new employees, including four full-time veterinarians, will be employed to work on the project with present faculty members of the microbiology and pathology departments.

Here each month are published ideas, suggestions and comments picked up by VM reporters at veterinary meetings.

The Meeting Circuit

Practice Tips From Wyoming

A free exchange of practical pointers frequently provides the most interesting and valuable portion of a meeting. A section of the Wyoming State Meeting, June 14, was devoted to this type of exchange. Moderated by Dr. Brinton Swift, an unusual number of fine ideas were revealed.

Vaginal Eversion

DR. JOHN C. SIMONS, Torrington, reported that in vaginal prolapse, koroseal stomach tube sections are used instead of gauze ties to secure the vaginal-body wall sutures in the subsacral region. This procedure is carried out under epidural anesthesia and local infiltration of the skin area where the needle, passed from the vagina to the outside, makes its exit. Such through and through ties are usually removed ten days after the animal has calved and discharged the placenta.

DR. BRINTON L. SWIFT, Buffalo, reported that the use of an abbreviated glove with a lead center in the palm, called a sailor's palm, is useful to force the large needle through to the outside of the returned vagina.

In answer to a question as to whether he has encountered paralysis in this procedure, Doctor Simons commented that it is possible that the sciatic nerve might be damaged by the needle passing through this area, but that it is sometimes possible to palpate the vessels in the subsacral region and by avoiding these, the sciatic nerve is probably also avoided.

DR. H. A. MICHAEL, from Lander, said that he used a purse string suture about the labia after correction of vaginal eversion in the cow. This procedure has been entirely satisfactory.

Urethrotomy Technics

STERILIZED, plastic, infant stomach or feeding tubes having an adapter on one end for a syringe are used in urethrotomies to insure patency by Dr. R. E. Fuechsel, Riverton. Dr. W. L. Rollins, Powell,. reported that when the urethra is severed in the operation for calculi in cattle, he prefers to carry out the operation as high up as possible. With this method it has been found that the urine is distributed away from the body.

Notes On Equine Practice

IN TREATING puncture wounds in horses, Dr. Douglas McLean, Riverton, inserts oral cortisone into the wound after the area has

been cleaned. This provides prompt relief of the swelling.

DR. R. A. BALDWIN, Gillette, reported that 125 mg. of Thorazine plus Combiotic daily intramuscularly for three days has been found useful in puncture wound lamenesses, and in such conditions as bog spavin.

DR. JOHN WILSON, Sheridan, reported that when 3 cc. of promazine was given intravenously to a horse, excitement was produced with death following in eight hours. This was the first instance of untoward results in years of use of the tranquilizer.

DR. E. S. NORTON, Lander, commented that this reaction with tranquilizers is not uncommon. An animal given tranquilizer should never be confined or tied up. Frequently a sort of phobia against confinement is generated. Such a reaction in a horse has been found to disappear when released and then reappear when confined in a chute.

DR. HUBER, Charles Pfizer Laboratories, commented that these phenothiazine derivatives are supposed to reach a certain threshold and then will develop an excitant effect rather than tranquilization. Tranquilizers also have a pronounced effect on the circulatory system and definitely are not indicated as part of the treatment in shock.

DR. S. G. HASTINGS, Sheridan, reported that Diquel has been found to produce general anesthesia in horses. DR. L. K. WAYT of Colorado State University said that promazine hydrochloride given slowly intravenously over a period up to five minutes will quiet horses in five to 15 minutes. It is the only tranquilizer that is recommended for the horse by Colorado State University. It should not be used when the horse is excited, in a state of shock, with infections, or if the animal is heavily parasitized. Temporary paraplegia has been encountered when it has been used after procaine injections. Reactions also have been encountered with drugs other than the tranquilizers.

DR. H. A. MICHAEL, Lander, pointed out that with the present tendency to utilize cesareans for cases of dystocia, the long used embryotomy procedures should not be overlooked. In the same way, older drugs should not be discarded in favor of some of the new ones. Sedative agents such as chloral hydrate still have their place in spite of the development of tranquilizers.

Management Of Actinomycosis

ACCORDING to Dr. B. D. Stauffer, Arvada, Colorado, 5 gm. of streptomycin injected into the opened actinomycotic abscess and adjacent region of cattle provides a smooth healing process. This procedure has replaced the older one involving the use of bichloride of mercury. In the older procedure, when a multiple or large actinomycotic abscess was encountered, bichloride was used to slough out the scar tissue. A thin layer of absorbent cotton about one fourth of the usual layer found in packages is spread out, sprinkled with crystals of bichloride of mercury, and the cotton rolled to cigarette size and worked up into the draining tract. This produces a terrific reaction and so should not be employed in the pharyngeal area because of the danger of suffocation.

IN BONY ENLARGEMENTS attendant to lumpy jaw, Dr. R. A. Baldwin, Gillette, uses five gm. of streptomycin intramuscularly, twice daily for five days. In severe cases this would at least prevent continuation of the process and allow utilization of the animal for the current season. In other cases it would take about six weeks for recovery.

DR. MINOL OTA, Lovell, said that 30 cc. of 10% formalin may be injected into the tissues in lumpy jaw. In about two weeks this area is well demarcated, and in about one month it will slough.

A.V.M.A.—PAN AMERICAN CONGRESS

JOINT MEETING

A record attendance of near 4,300 registrants participated in the 96th Annual Meeting of the American Veterinary Medical Association in Kansas City August 23-27, 1959. The meeting was held jointly with the Third Pan American Congress of Veterinary Medicine. The spacious, air conditioned facilities of Kansas City Municipal auditorium accomodated the largest meeting in history with uncrowded convenience that defied the unseasonably hot weather of the midwest.

Directing Council of the Pan American Congresses of Veterinary Medicine: Seated (left to right): Brigadier General (ret.) J. A. McCallam (U. S. A.); Dr. Benjamin D. Blood (Argentina; secretary general—does not represent a country); Dr. Pablo Zierold (Mexico); Dr. J. G. Hardenbergh (U. S. A.); Dr. Outubrino Correa (Brazil); and Dr. T. Lloyd Jones (Canada). Standing left to right): Dr. Juan F. Figueroa (Peru); Dr. Alberto Ramirez (Venezuela); Dr. Hector R. Camberos (Argentina); Dr. Leon Pacifico Bravo (Eucador); Dr. Hugo P. Sievers (Chile); Dr. Francisco R. Rodas (Guatemala); Dr. Carlos Rojas Maldonado (Colombia); Dr. Ruben Lombardo (Uruguay); Dr. Constantino Brandariz (Argentina); Dr. Ricardo Molina Aguilar (El Salvador); Dr. Arsenio Vasconsellos (Paraguay); and Dr. Diego Villegas (Colombia).

In addressing the opening session, Dr. S. F. Schiedy, Philadelphia, incoming president of the association, discussed the impact on the profession of vertical integration in agriculture. He pointed out that vertical integration will affect the activities of many of our members. Where there is a great concentration of livestock, more veterinary and disease control work is required; where there is a reduction of livestock, veterinarians are obliged to find other and different types of work. In areas where farm livestock has been decreased, there is frequently an increased residential development resulting in opportunities for small animal practice, food inspection, and public health work.

DOCTOR S. F. SCHIEDY
President

Since the primary reason for integration in animal agriculture is more efficient production, it will surely afford an opportunity for the veterinarian to become an important partner in the business.

Doctor Schiedy observed that while a large number of animals are concentrated in one place, they must be handled carefully in order to control diseases, parasites, and other factors that adversely affect livestock production.

Another change in veterinary practice is the growth of partnerships and group practices. Although the general practitioner of veterinary medicine will undoubtedly continue for a long time as the backbone of veterinary medicine, he alone cannot supply all the services that will be required. The assistance of partners with special training will be needed. Some of the specialties growing in popularity are radiology, specialized surgery, infertility work, laboratory services, animal nutrition and toxicology.

Impressive to those present during deliberations were the courtesies of the members toward each other, the unflagging interest of the convention registrants in all the subjects discussed at the various sessions, the cooperative spirit always prevalent, the high degree of intelligence and the public-speaking ability of its leaders, and the high esteem shown by rank and file members for their respective association officers.

The New President

Dr. Elden E. Leasure, dean of the School of Veterinary Medicine, Kansas State University, was named president-elect of the AVMA at the second session of the House

Dr. E. E. Leasure
President-elect

of Delegates. Dr. Fred B. Pulling, Jr. of Atascadero, California was elected vice-president of the association for the 1959-1960 term at the same session. Doctor Pulling is a general practitioner and has served as alternate delegate to the AVMA House of Delegates for the past six years.

Gaines Award

Awards presented at the opening session were the Gaines Award to Dr. Wade Brinker, professor and head of the Department of Surgery and Medicine, College of Veterinary Medicine, Michigan State University. The award, a gold medal and $1,000 is presented for significant contributions to the advancement of medicine and surgery for small animals. Doctor Brinker conducted research on penicillin blood levels in dogs and in bone and joint surgery.

Borden Award

Dr. Peter Olafson, head of the Department of Pathology and Bacteriology at New York State Veterinary College was presented the Borden award for outstanding research contributing to dairy disease control. Doctor Olafson was the first veterinarian to describe bovine listeriosis, to establish that hyperkeratosis was the result of a poison and not a virus, and to isolate the virus of mucosal disease of cattle.

A.V.M.A. Award

The AVMA Practitioner Research Award went to Dr. Edwin A. Churchill, Centreville, Maryland, in recognition of his contribution to veterinary medical research in horses.

XVII Veterinary Congress Award

The XVII International Veterinary Congress Prize was awarded to Dr. William H. Feldman, Washington D.C. for his outstanding service to veterinary science and the veterinary profession; and Dr. John G. Hardenbergh was presented the 1959 AVMA Award for his distinguished service to the AVMA during the past 18 years. Doctor Hardenbergh retired as executive secretary in September 1958, but has continued to serve the association as general consultant and treasurer. His plans include retirement from this position on December 31, 1959.

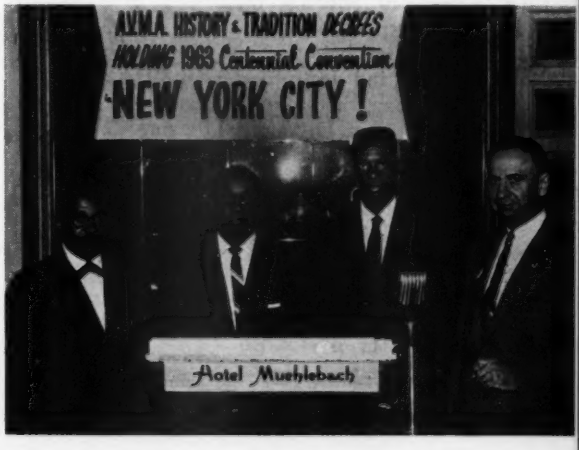
During the convention it was announced that Dr. Arthur Freeman, Parkville, Missouri, will join the AVMA staff as assistant editor on September 15, 1959. A graduate of Ohio State University in 1955, Doctor Freeman has served as editor of the *Jen-Sal Journal*. It was simultaneously announced that Dr. L. Meyer Jones, professor of veterinary pharmacology, Iowa State College, will become a member of the AVMA headquarters staff in February 1960. His duties include processing of manuscripts for the *American Journal of Veterinary Research* and he will work with the Council on Biological and Therapeutic Agents and the Research Council.

The otherwise enjoyable meeting was marred by the death of two veterinarians in attendance and a critical illness of a third. Dr. U. E. Marney (KCV '12), 78, of San Antonio, Texas, died at Kansas City's Menorah Hospital of gastric hemorrhage. Doctor Marney, one of the outstanding leaders of the profession in Texas, was a life member of the AVMA and past president of his local and state associations. He had attended AVMA conventions for more than 25 consecutive years.

Dr. Albin S. Einoris (CVC '20), 65, West Palm Beach, Florida, died of a heart attack while attending the convention. Doctor Einoris and his wife came to this country from Lithuania and for many years he practiced in Mishawaka, Indiana. He later moved to West Palm Beach where he was still in practice.

Dr. I. A. Schipper, associate professor, Department of Veterinary Science, North Dakota Agricultural College, Fargo, North Dakota suffered a heart attack shortly after delivering his paper on Mucosal Disease. At the close of the meeting Doctor Schipper remained in serious condition at Research Hospital, Kansas City.

One alumni dinner was highlighted by the gathering of more than 60 graduates of the old Kansas City Veterinary College from 1891 to 1918. A special guest was the lady who was secretary to the dean.



Shown here is the Science Fair Winner being presented to the A.V.M.A. House of Delegates during the recent convention in Kansas City. Left to right are Mr. J. Michael Graves, science teacher, Burke High School, Charleston, South Carolina; Mr. W. R. Meriwether, father; and Mr. W. Delano Meriwether, winner of the award. Dr. Sam Schiedy is shown at right.

CONVENTION NOTES

Ovine Virus Abortion

OVINE VIRUS ABORTION is caused by one of the psittacosis-lymphogranuloma group. The infection is characterized by abortion. Elementary bodies may be demonstrated in the cotyledons and the chorion, from which tissues the infection can be reproduced in pregnant ewes, guinea pigs, mice, and chicken embryos.

The disease is indistinguishable clinically from vibriosis. Serological identification can be achieved by complement-fixation or agglutination tests of serum three months prior to, and one year after, abortion. Lifetime immunity is produced by natural infection or vaccination.—*E. A. Tunnicliff, D.V.M., M.S., Bozeman, Montana.*

The Diagnosis and Control of Leptospirosis

LEPTOSPIROSIS is a difficult problem to the large animal practitioner because the disease manifests itself in so many different forms. It is one of the most inconstant diseases that we have encountered from the standpoint of signs of the infection.

Serological surveys have indicated that leptospirosis is widespread among livestock, wildlife, and rodents. The majority of infections in animals apparently exist as inapparent clinical infections. Under certain conditions or stress, severe signs may be apparent and death may result. The causative organism, therefore, may be classified as an opportunist. Differential diagnosis by physical signs is most difficult or even impossible because of the great variance of symptoms. Laboratory confirmation is essential in most cases.—*Marvin J. Twiehaus, D.V.M., M.S., Manhattan, Kansas.*

Foot Rot in Cattle

DUE TO THE GREAT LOSS that can occur in the feedlot or in dairy cattle from the standpoint of loss of production and weight losses, the veterinarian's efforts must be exerted toward attempting to prevent this disease. Cattle that do not respond to treatment are usually candidates for amputation of a claw. Although this surgery is successful in most cases, it constitutes another period of long healing and loss of production.— *O. R. Adams, D.V.M., Fort Collins, Colorado.*

Anesthesia and Ablation of the Bovine Eye

IN PREPARING the bovine eye prior to surgery, clip and scrub the operative area, then use 100 to 120 cc. of 2% procaine or procaine and epinephrine. Starting at the lateral canthus, infiltrate around the eye, taking care to stay above and below the lines of incision. Then 30 to 40 cc. of procaine is injected at two or three sites on the upper and lower lids, toward the base of the socket, infiltrating as the needle is inserted. Then wait about 20 minutes before operating.

The initial incision is along the lower lid, through the skin and fascia. A matching incision along the upper lid meets the first incision at the medial and lateral canthi. Use surgical scissors to work down around the eyeball and sever the muscles, taking care to remove all abnormal tissue but leaving as much healthy tissue in the socket as possible. The optic blood vessels and nerve are severed with a chain ecraseur. The socket is then packed with iodine-saturated gauze, and the lids closed with interrupted sutures. The pack is removed in 36 to 48 hours. —*Paul Christian, D.V.M., T. T. Christian, D.V.M., Waco, Texas.*

Mucosal Disease Agent

AN AGENT PRODUCING CYTOPATHOGENIC effects on bovine kidney cell suspension has been isolated from spleen and whole blood removed from animals with typical symptoms and pathological changes of mucosal disease. Experimental calves, negative for neutralizing antibodies for BMD, given tissure culture agent of BMD intravenously, exhibited slight temperature elevation and

diarrhea. Neutralizing antibodies were present 15 to 25 days postinoculation.

Water removed from the drinking trough of isolated animals with typical symptoms of BMD was placed in water troughs of experimental calves. The experimental calves showed mild symptoms of mucosal disease seven to 12 days following the initial transfer of water.—*I. A. Schipper, M.S., D.V.M., and Frank M. Noice, Ph.D., Fargo, North Dakota.*

Serological Relationship of New Feline Viruses

THE FELINE RESPIRATORY DISEASE SYNDROME has been complicated by the isolation from clinically ill cats of a number of viruses cytopathogenic for feline kidney tissue culture cells. The majority of these viruses have been isolated from the upper respiratory tract or conjunctiva.

Many of these feline viruses have been isolated by investigators from different laboratories throughout the country and studies were undertaken to determine their serological relationship by reciprocal cross-neutralization tests in tissue culture. A method of classification was proposed to permit more uniform reference to these agents by the various investigators.—*James L. Bittle, D.V.M., Charles J. York, D.V.M., Ph.D., Marian Martin, B.S., Indianapolis, Indiana.*

Michigan Tuberculosis Eradication

APPROXIMATELY 30% of the nation's total tuberculosis reactors were disclosed in Michigan during the past fiscal year.

Why would a state, which received modified accreditation status in 1930 as the third in the nation, now rate higher infection than any other?

During the ten years following state accreditation, prior to accreditation of the country, a heavy retesting program was maintained with a continuing decrease in the infection rate down to 0.1%.

With the generally accepted attitude, following national accreditation in 1940, that a continuing minimum program would lead to eventual eradication, the volume of testing in Michigan decreased and the incidence of infection increased.

This picture has become impressive in certain areas during the past five years where as many as one of five herds have revealed reactors under the recently adopted 100% testing program. This present heavy volume of testing is responsible for the large number of reactors being revealed in this state.

To complete the eradication project, all associated Michigan agencies and the livestock industry agree that the present intensive effort must be continued to overcome the upsurge resulting from the period of complacency which followed national accreditation.—*Asa Winter, D.V.M., Lansing, Michigan.*

Problems in Treatment and Control of Leptospirosis

ALTHOUGH TEN DAYS or more are required after vaccination with a bacterin to develop demonstrable humoral antibodies, abortions in the cow may continue for three to five weeks. Attempts to reduce such losses, which may exceed 25%, include: (1) vaccination at the earliest opportunity following signs of the infection, together with administration of antibiotics in the feed or water; (2) parenteral treatment with antibiotics of cows which abort, to reduce death losses associated with retained fetal membranes; (3) control of surface waters to reduce further exposure of herds.

Vaccination of cows with an attenuated living strain of *Leptospira pomona* during an epizootic has resulted in a 66% reduction in abortions. Such a vaccine (1) stimulated the formation of antibodies which appeared by the fourth day and which had persisted for at least 31 months, (2) produced minimal shedding for one to two weeks in yearlings, (3) did not appear to interfere with normal parturition, and (4) was found nontransmissible from vaccinated to susceptible contact-control cattle.

Preliminary studies suggest that the hemolytic test may be an important aid in the

control of bovine leptospirosis due to the genus specificity and to the disappearance of hemolytic antibodies within five to six months after infection. — *S. G. Kenzy, D.V.M., Ph.D., R. W. H. Gillespie, Ph.D., L. M. Ringen, Ph.D., Pullman, Washington.*

Artificial Insemination of Swine

THREE ADVANTAGES of artificial insemination in swine are: (1) In a program of unit hog production, groups of sows could be inseminated during a period of a few days to produce a group of pigs of uniform age to be raised as a unit; (2) outstanding sires may be mated to a greater number of sows by dilution and distribution of semen—this would greatly incerase the potential progeny of a superior boar; (3) disease control in a group of sows would be simplified because it would be unnecessary to introduce a boar from another farm into a herd of relatively disease-free sows.—*James E. Lovell, D.V.M., Ph.D., Ames, Iowa.*

Distaff

MRS. E. F. (HAZEL) EBERT

Another most interesting and pleasant American Veterinary Medical Association meeting is past, but I am sure those of us who attended felt well paid for their time and efforts.

I feel certain I am expressing the thanks of all the wives to the Kansas City ladies who entertained us so well. Our thanks also goes to the research men and commercial exhibitors for their exhibits.

These exhibits take much thought, time and money. They are made to show the needs and progress of veterinary medicine. They are made not only for the veterinarians, but for the wives who are privileged to study and enjoy them. I feel the wife of a veterinarian is not progressing with her husband if she does not take advantage of the opportunity to learn more, and to have more interest in her husband's profession.

The Auxiliary to the American Veterinary Medical Association is interested in the growth of its membership and in its members' interest in veterinary medicine.

It has been said in many of our meetings there would be no need for local and state officers to practically beg the wives to join the auxiliary of the A.V.M.A. if the wives knew how their dues were spent. Not one dollar is spent for social activities. There are so many worthwhile needs for each dollar, and it is spent wisely and within the profession.

I mention first the student loan fund and awards. The undergraduate and graduate students may use the auxiliary loan fund, and for many students this has meant the difference between graduating and leaving school.

The awards are given to one student of each veterinary school each year. The amount has been raised from twenty-five dollars to fifty dollars, which has helped the recipient very much, as one student said it meant a new tire for his car and gasoline to get him to his new job.

The auviliary contributes to the Research Fund each year. I think this is just giving money back to the profession in the form of answers to many problems for the practitioners, the drug manufacturers, the educators, research men, in fact to all persons concerned with any field of veterinary medicine.

Through these funds the wives of veterinarians can feel they may contribute to their husgand's work and share in his pride of his profession.

Malignant Catarrhal Fever

LEE M. RODERICK, Ph.D., D.V.M., M.S.

Kansas State College
Manhattan, Kansas

MALIGNANT CATARRHAL FEVER (MCF) is a highly fatal encephalomyelitis of cattle that is evidently viral in nature. It was aptly termed "snotsiekte" (snot sickness) by the South African workers Meltam[1] and Daubney and Hudson[2] (fig. 1 above).

Some of the transmissible diseases of cattle are probably immunologically distinct entities, yet possess certain features in common. Pritchard,[3] comparing the clinical signs of the mucosal diseases of cattle, lists virus diarrhea of the New York and Indiana strains, Child's cattle disease, MCF, upper respiratory disease, necrotic rhinitis and tracheitis, and rinderpest, to which might be added bovine encephalomyelitis.[4] The morbidity of rinderpest is decidedly higher than that for MCF and the pathology differs.[5]

Malignant catarrhal fever was recognized in New York and Pennsylvania as early as 1913.[6] The last edition of Doctor Udall's book[6] gives a concise and authoritative discussion of MCF. More recent reports by Stenius[7] in Finland and by Piercy[8,9] and Plowright[10] are not readily accessible to veterinarians in this country. This report is a discussion of the pathology and the epizoology of MCF as it is observed in this country.

Abstract of technical bulletin no. 97, Kansas Agricultural Experiment Station, Manhattan, Kansas, September 1958.

Reprints of this report will be available in limited quantities from VETERINARY MEDICINE at cost.

Occurrence and Epizoology

Malignant catarrhal fever is evidently world wide in its distribution. It has been studied extensively in Africa by a number of workers[1,3,8,9,10] and in Finland.[7] It was studied by the writer at the North Dakota Agricultural Experiment Station in cooperation with the State Livestock Sanitary Board.[11] Goss[12] in 1916 reported the disease in Kansas, and it has been reported in the state sporadically since 1938. McNutt[13] reported occasional outbreaks of the disease in Iowa. Barner and Montgomery[14] and Berkman and Barner[15] reported that the disease had been encountered in Michigan for years.

It sometimes occurs sporadically in isolated herds without any known association with other outbreaks. One of the puzzling features of the epizoology of the disease is the ability of the virus to survive in nature in sheep or wildlife independent of passage through cattle. Farquharson[16] reported that in Colorado only the peracute type of the disease was recognized. "While sheep and cattle were usually associated on the same farm, only 1% and not over 2% of the cattle succumbed to the disease on apparently infected premises." Stenius[7] reviewed the susceptibility of several species of wildlife as reported by a series of workers. Except for sheep, which seem to be carriers, none of the other species seem to be incriminated in the epizoology in this country.

A characteristic feature of the epizoology of MCF is the persistence of the infection on certain farms and its failure to spread to adjoining farms. This was observed repeatedly by the writer in both Kansas and North Dakota. Brandenburg[11] in his report for 1937 listed six problem herds with MCF in North Dakota. Material from another farm was received at the North Dakota laboratory from a herd in Minnesota. While most of those herds were located in the southeastern portion of North Dakota, there was no recognizable contact between the infected herds. The losses in the "L" herd approximated 100 head of cattle over a period of years. Losses in the "J" herd continued despite the use of hemorrhagic septicemia biologics. In desperation the owner finally sold the herd for slaughter.

Photo courtesy of North Dakota Agricultural Experiment Station.

Fig. 2. An experimental case of malignant catarrhal fever.

A loss of 28 head of cattle occurred in the "W" herd in spite of the use of hemorrhagic septicemia bacterin, thus the disease literally drove the owner out of the cattle business. A loss of practically half of the "G" herd from MCF occurred in Kansas between March and July 1943.

Association of cattle with sheep was not reported in all of the North Dakota outbreaks, and yet in every outbreak investigated in recent years, sheep have been found on affected farms. Sheep may well be inapparent virus carriers and yet exhibit no visible signs.[17] There are inapparent virus carriers in equine infectious anemia, but the carrier stage in cattle is unlikely since affected animals regularly die.

Etiology and Sources of Infection

It is obvious that MCF is a transmissible disease. Meltam[1] found that it was invariably fatal and that the disease broke out when cattle and wildebeests were together. Experimentally, the disease could only be induced in cattle by intravenous and subcutaneous inoculation of blood of affected

Fig. 3. Typical head and eye symptoms.

cattle. Only two of 70 cases in Meltam's[1] experiments did not succumb to the disease. Although the wildebeests were found to harbor the virus, they were never observed to show signs. Daubney and Hudson[8] were able to transmit the disease through four serial passages in cattle by the intravenous inoculation of blood from clinical cases of the disease. The disease was induced in 33 experimentally inoculated cattle, and all died. In the course of the North Dakota investigations,[11] the writer was likewise able to transmit the disease through three serial passages in cattle by the intravenous inoculation of blood from affected cattle (fig. 2).

Piercy[9] succeeded in transmitting the virus through 19 passages in cattle by the inoculation of lymph gland material. There was no significant reduction of the incubation period apparent by the 19th passage. No cases of contact infection occurred although susceptible cattle were at all times close to reacting animals. Attempts to filter the virus failed. Piercy[9] in a subsequent report had effected 35 serial passages in cattle by the subcutaneous injection of lymph node material. Plowright[10] found a progressive leukopenia in the disease, starting about the same time as the generalized enlargement of the lymph glands. This seems to parallel other types of virus infections. The causative agent of MCF seems, therefore, to be a neurotrophic virus with some essential organotrophic features.

Sheep are undoubtedly carriers of the MCF infection. Piercy[10] and Stenius[7] reported direct transmission of the disease from sheep to cattle and possible transmission from cattle to cattle. Blazhevich[10] observed 18 places where MCF was present, and in all cases cattle were pastured or stabled with sheep. In a few villages, cattle were segregated from sheep and remained free of the disease. Infected cattle recovered when they were segregated from sheep and did not infect disease-free herds when placed with them.

A Kansas farmer, "P," following an outbreak of MCF disposed of his cattle and moved to a farm about 100 miles distant. He retained no livestock except a flock of Hampshire sheep. In time, the disease appeared among the newly purchased cattle. The sheep, which were in contact with the cattle with MCF on the original farm, undoubtedly were responsible for the disease in the new herd of cattle.

Nevertheless, one of the puzzling features of the epizoology of MCF is the origin of isolated outbreaks and the location of the reservoir of the infection. It seems rather improbable that the virus persists indefinitely in sheep without passage through cattle, which seem to be the only probable susceptible host of the disease in this country (fig. 3).

The morbidity indicates a slow spread in the herds. Usually only one and occa-

sionally two animals are sick at a time. The morbidity at any one time is low, but over a longer interval it has usually been considerable. Sporadic and isolated outbreaks sometimes occur. An example was the Kansas "G" herd with a mortality of about half of the herd within less than five months with no other reported cases in the community (fig. 4).

The case mortality in both North Dakota and Kansas, where the head and eye form of the disease has usually been seen, has been high. Seldom, indeed, has a recognized case recovered. Udall[6] cites Götze as having recognized a mild form of MCF in Germany in which recovery was the rule. Stenius[7], in Finland, in a series of 1,200 cases, reported a mortality of only 35%.

The Incubation Period

The incubation period seems to be prolonged but probably this can be evaluated better experimentally than under field conditions. The first successful transmission experiment in cattle at North Dakota required an incubation period of six weeks. A cow was injected intravenously with 600 ml. of citrated blood of an animal from a farm where the disease had been enzootic for a considerable period of time. Daubney and Hudson[8] stated that the incubation period varied from 14 days to 13 weeks. Stenius[7] observed intervals of 14 to 150 days, but the longer interval may have involved a subsequent exposure.

All ages are probably susceptible except that young calves seldom develop the disease. Daubney and Hudson,[8] however, found it in calves. Stenius[7] reported that it does not often occur in calves and that most of the cases are from one-half to five years of age. Most of the cases seem to occur during the winter and early spring, although they have been encountered in cattle on pasture in July and September in Kansas.

Symptoms

The onset of the disease often appears suddenly in that the cattle may be critically ill in the morning after appearing normal the night before. The temperature during the course of the disease is regularly elevated to from 105 to 108 F. even in the mornings in warm weather. There is often an acute stomatitis and pharyngitis. It is more likely to be catarrhal to hemorrhagic rather than ulcerative, which is more characteristic of mucosal disease.[20,21]

There is an intensely swollen, hemorrhagic inflammation of the upper air passages, nasal septum, larynx, trachea, and paranasal sinuses. The mucosa assumes a dark, purplish, red color. Seldom does any other disease show such an intensely hyperemic engorgement of the mucosa of the upper air passages.

The course varies from a day to several days. Animals with the head and eye form of the disease seldom survive for more than a week to ten days. It is not unusual to find loosening of the horns. The animals appear dejected. Lacrimation soils the hair of the face. Keratitis, cloudiness of the cornea, and photophobia impair the vision to the point of blindness (fig. 3). Animals may blunder into fences and feed troughs. They are sometimes excitable and even aggressive. The muzzle is sometimes ulcerated, soiled, and crusted with a mucopurulent nasal discharge. The intense hyperemia with the accompanying exudation of the upper air passages leads to increased respiratory difficulty and may even suggest pulmonary involvement.

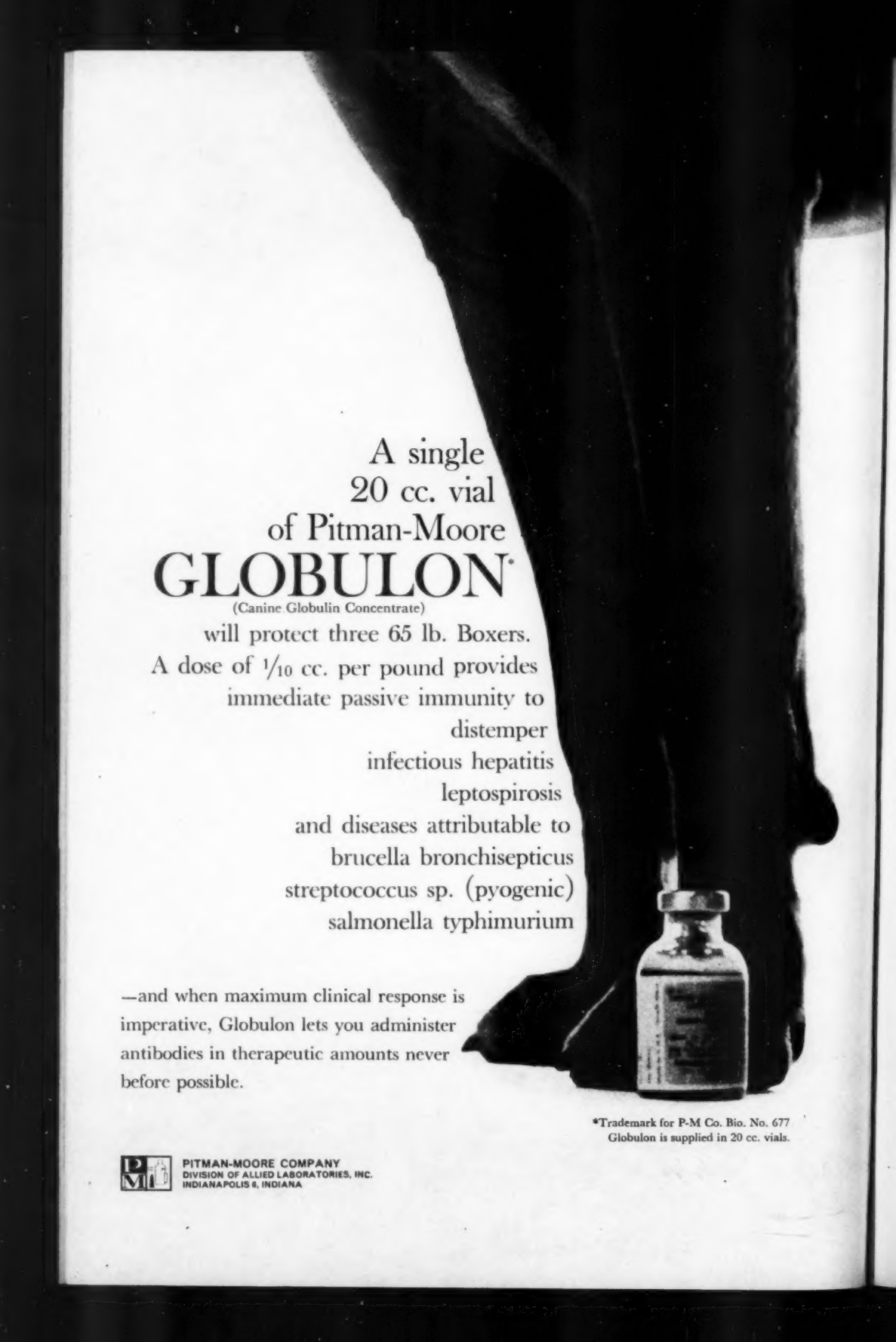
The nasal discharge, which is mucopurulent, ropy, fibrinous, and sometimes mixed with blood, may hang from the muzzle. There is marked prostration in well established cases of the disease. Extension of the head, staring expression, lack of appetite, and complete suppression of the milk flow are additional symptoms. Local or general trembling and rapid loss of condition are obvious. Fetid diarrhea, which may be tinged with blood, usually accompanies the involvement of the digestive tract.

Pathology

Carcasses dead of MCF are emaciated, for the condition of the affected cattle rapidly deteriorates as a part of the disease process and due to the loss of appetite. The hair coat is rough with irregular hairless areas. Many of the lymph nodes are swollen. The lymph glands of the head are markedly swollen to a crimson red and

Continued on page 529

SMALL ANIMAL PRACTICE



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Clinical Diagnosis of Canine Whipworm Infection

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Confusion with Ova of Capillaria spp. in Therapy with Phthalofyne

PRIOR TO THE INTRODUCTION of the drug phthalofyne (Whipcide—Pitman-Moore) in 1954, no agent was known that would control whipworm infections in dogs conveniently and consistently. With orally administered phthalofyne, a high worm-clearance rate was demonstrated in early reports of controlled tests. Ehrenford[1] obtained a clearance rate of 89% of infected dogs with oral doses of 200 mg./kg. (90 mg./lb.), and Burch[2] obtained worm clearance in 95% with either single oral doses of 250 mg./kg. of phthalofyne (115 mg./lb.) or two doses of 200 mg./kg. each, given morning and evening. The results of clinical trials[3-6] substantiated these findings.

Subsequently, it was discovered that phthalofyne also was effective against whipworm infections in the dog when given intravenously (Ehrenford *et al.*[7]). In tests reported by Eshenour *et al.*,[8] intravenous doses of 250 to 300 mg./kg. produced clearances in the 97 to 100% range. Clinical trials subsequently proved that intravenous medication with phthalofyne is a highly effective and practical procedure (Burch *et al.*[9]).

However, practitioners periodically reported the occurrence of resistant cases, in which whipworm-like ova continued to be shed by dogs even after many treatments. Enzie[10] pointed out that the close resemblance of whipworm ova to those of Capillaria spp. undoubtedly led to erroneous diagnosis of whipworm infection in cats in the United States. The possibility that ova of *Capillaria aerophila* were being mistaken for those of *Trichuris vulpis* was therefore considered when reports were received that a dog had proved resistant to Whipcide therapy. The following investigation was made to clarify this point.

Methods

Routine fecal examinations were made, using a sodium dichromate solution having a specific gravity of 1.36 (790 gm. sodium dichromate in one liter of water). Data were obtained on 2,318 randomly selected dogs of mixed breeds from the Ohio River Drainage Basin during 1958, showing the incidence of infections with *T. vulpis*, *C. aerophila*, and Capillaria spp. (including both *C. felis-cati* and *C. plica*).

While the identification of capillarid species by the characteristics of their ova is possible, the meticulous and critical examination of numerous ova that is required for species identification is not practical or necessary for routine clinical use. The recovery of adults from definitive sites is also conclusive, but they are difficult to find, and normally are not readily accessible to the clinician. However, the clinical differentiation of capillarid ova as a group from those of *T. vulpis* may be made readily by direct comparisons (table 1 and figure 1).

In figure 1, the ova of *C. aerophila* are illustrated in comparison with those of *T. vulpis*, *Ancylostoma caninum*, *Uncinaria stenocephala*, Taenia spp., and *Toxocara*

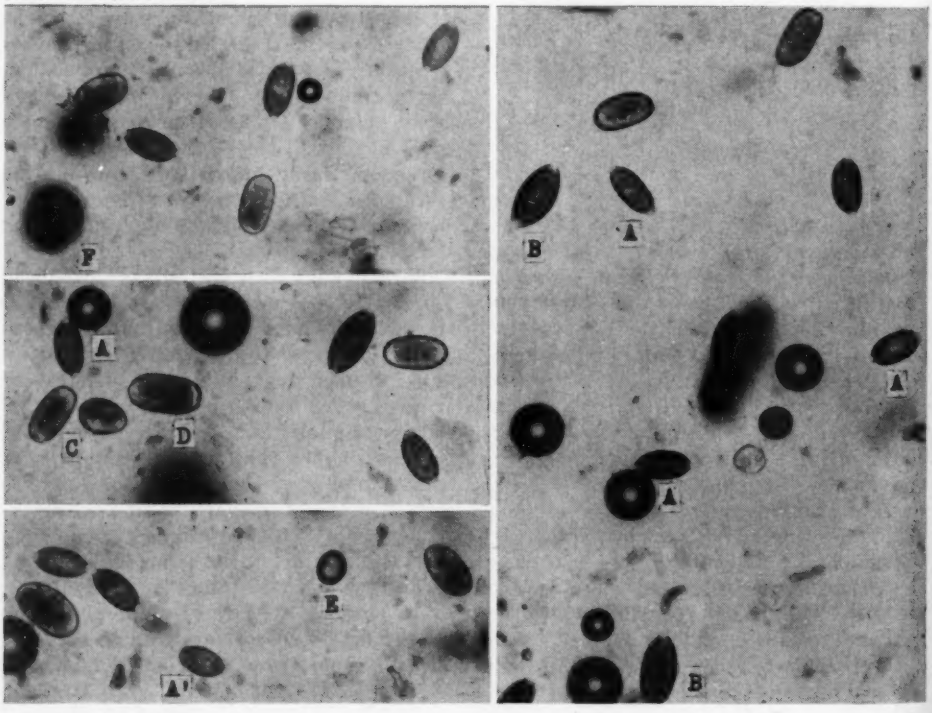
canis. The ova of *C. aerophila* vary somewhat in size and shape, but they all fall within a characteristic range and this also is true of other ova. Occasionally atypical ova of any of the species are found, but enough characteristic ova will be present so that confusion is minimized. Practitioners who routinely examine cats have an additional point of reference, since the whipworm-like ova commonly observed in the cat are Capillaria spp., never whipworm (Enzie[10]). Feline capillarid ova, according to Haberman and Williams,[12] have the same characteristics as those seen in dogs. The fact that appearance of ova is influenced somewhat by such factors as normal variation, host species involved, or the solutions used for flotation, would account for the apparent differences between the illustrations of *C. aerophila* ova in the text by Benbrook and Sloss[13] and those in figure 1.

When an ocular micrometer is available, the measurement of several ova greatly facilitates differentiation. In the absence of an ocular micrometer, direct comparison of ova also provides an accurate basis for differentiation by means of size groups: the smaller capillarid ova are approximately equal in length to those of *A. caninum* and contrast with the larger ova of *T. vulpis*, which approximate the length of *U. stenocephala* (*Ehrenford*[11]). As indicated by the data in table 2, the administration of therapeutic doses of phthalofyne provides an ad-

TABLE 1. Clinical Differentiation of Ova of *Trichuris vulpis* and Capillaria spp.

Species	Length in Microns	Ova in Feces 5 Days After Phthalofyne Therapy
Ancylostoma caninum (Size reference)	55-68	
Capillaria aerophila	55-68	persist
Capillaria felis-cati	55-65	persist
*Capillaria plica**	55-65	persist
Trichuris vulpis	70-86	absent
Uncinaria stenocephala (Size reference)	74-86	

*Ova of *C. plica* normally are found in urinalysis procedures.



Canine parasitic ova: A, *Capillaria aerophila*; A', atypical *C. aerophila*; B, *Trichuris vulpis*; C, *Ancylostoma caninum*; D, *Uncinaria stenocephala*; E, Taenia sp.; F, *Toxocara canis*. x92. Photomicrographs by R. F. Albright, General Hospital, Indianapolis, Indiana.

ditional criterion for differentiation. Capillarid ova persisted in the feces after such treatment, whereas those of *T. vulpis* disappeared within two to five days.

Results and Discussion

In the 2,318 dogs examined in this study during 1958, *T. vulpis* infection alone had a rather high average incidence of 56% (seasonal variation 50 to 64%); *C. aerophila* infection alone was found in 9.2%, and Capillaria spp. alone (includes both *C. felis-cati* and *C. plica*) in the range of 0.01%. Combined infections with *T. vulpis* and *C. aerophila* occurred in 6.5%.

The effect of phthalofyne therapy on mixed infections was studied in a number of dogs harboring both *T. vulpis* and *C. aerophila*. Fecal examinations were made for several days after treatment, after which the presence or absence of *T. vulpis* was determined at necropsy. As shown in table 2, the ova of *T. vulpis* usually disappeared completely by the third day after treatment, but sometimes were found as late as the fourth day. Although whipworm ova may disappear by the second day after treatment, it is advisable to defer appraisal of results, based on fecal examinations, until the seventh day. In this series no whipworms were present at necropsy performed on the seventh day after treatment.

The symptoms of canine whipworm and lungworm infections are variable, and not pathognomonic. However, the symptoms may justifiably suggest whipworm infection even when repeated fecal examinations give negative results. Burch and associates[9] noted that treatment with phthalofyne often was followed by clinical recovery from symptoms suggestive of trichuriasis.

The principal diagnostic problem involves the ease with which capillarid ova may be confused with those of the whipworm. Therefore, when an apparent failure in whipworm therapy (based on the results of fecal examinations) is encountered, the ova should be examined critically to determine whether they are those of Capillaria spp. Differentiation of these ova can be made readily in the clinical laboratory on the basis of the criteria presented in this paper, and should serve to clarify many apparent clinical failures in phthalofyne therapy.

Summary

An incidence of 56% for *T. vulpis* and 9.2% for capillarids was found in 2,318 midwestern dogs by fecal diagnosis.

The ova of Capillaria spp. infecting the dog are easily confused with the ova of *T. vulpis* (whipworm) in making clinical diagnosis. This appears to be a common cause of apparent failures in treatment with phthalofyne (Whipcide). When an ocular micrometer is not available, the ova of *Ancylostoma caninum* provide a convenient size reference for differentiation. Capillarid ova are of approximately the same length as those of *A. caninum*, in contrast to the whipworm ova, which are appreciably longer. In addition, the ova of *T. vulpis* usually disappear from the feces within five days after treatment with phthalofyne, whereas capillarid ova persist. Clinical appraisal of therapeutic results should be deferred, preferably

TABLE 2. Results of Phthalofyne Therapy in Dogs with Mixed Infections of *T. vulpis* and *C. aerophila*

Route of Administration	Dose in mg.	Ova Diagnosis (Genus)	No. Dogs	Samples Positive Post-treatment Days 2	3	4	5	6	7	Dogs Positive for Whipworms at Necropsy
Oral	225/kg (102/lb.)	Trichuris	6		2/6	0/6	0/6	0/2	0/2	0/6
		Capillaria			4/6	3/6	4/6	1/2	2/2	
Intravenous	250/kg (114/lb.)	Trichuris	5	0/1	0/5	1/5	0/5	0/2	0/2	0/5
		Capillaria		1/1	3/5	3/5	4/5	1/2	2/2	

*Numerator = number positive; denominator = number examined.

until the seventh day after treatment. The administration of phthalofyne is suggested as an additional diagnostic aid in the differentiation of these ova.

Acknowledgment

The authors express their appreciation for the efforts of Dr. Anton Schwarz and Mr. Ted Mayer in obtaining photomicrographs; to Dr. Karl Mayer for suggestions on the manuscript.

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Feeding the Alligator and Cayman

The cayman is a South American species of alligator and is the one most commonly sold today. Florida has restrictions on the export of native alligators.

Alligators eat dog food, fish, and meat products. In pets of this type, the diet when young is the conditioning factor. Most of the alligator group will cut out or down on food intake during the winter months. The feeding program will be directly related to environment. Temperature must be kept up around 80 F.; a low temperature will result in hunger strikes. Young alligators should be fed three times a week. Raw ground beef should be used for one feeding, and fresh raw chopped fish for the other two. Fresh minnows can be substituted for chopped fish.

For specific diet aid on other species such as coati mundi, raccoons, kinkajous, etc., I feel we should not hesitate to get help from the local zoologist whenever possible. These men are specialists in their field and are happy to assist the local veterinarian whenever possible. There are also a small but growing group of full time zoo veterinarians who are available when needed.—*L. E. Fisher, D.V.M.*

Cause of Alkalosis

Administration of desoxycorticosterone acetate, ACTH, or cortisone to dogs fed a potassium-restricted diet evokes metabolic alkalosis which is sustained only as long as the hormones are administered. A potassium-restricted diet alone results in a 15% loss of muscle cell potassium, but no alkalosis. Evidently, the serum bicarbonate elevation induced by the steroids is a relatively direct effect, one that cannot be dependably related in a reciprocal fashion to the associated loss of body potassium.

Previous studies have demonstrated a close correlation between loss of muscle cell potassium and increase of serum bicarbonate in intact rats and suggested that adrenocortical activity may be responsible. Histologic and physiologic evidence of adrenal hyperactivity in potassium-depleted rats has also been recorded. Potassium deficiency has not been associated with alkalosis in adrenalectomized animals unless steroids are given, and at dosages considerably higher than maintenance levels. — *American Journal of Physiology, 196:135, 1959.*

PRACTITIONER'S REPORT

Prepuberal Sexual Behavior In Dogs and Cats

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THE PROBLEM OF ANIMAL PLAY is one that has intrigued many astute investigators. During the last century, Herbert Spencer promulgated the surplus energy theory of play, which stated that play was a manifestation of sheer exuberance and a way of dissipating excess energy. This theory broke down because it was well known that animals continued to play long after their exuberance was gone. The exhausted dog will still lope after a stick that is thrown in order to retrieve it. The panting cat will still take a final swipe at its catnip toy. Animals seem to play not to dissipate excess energy, but simply for the sake of play. Later, an instinctive theory was postulated, which stated that play was simply instinctive. But this theory also broke down because it could not adequately explain the special forms of activities that were manifested in play. It could not explain sexual play or fighting play or hunting play. The generally accepted theory is the so-called biological theory of play, which states that play is the necessary prelude of prepuberal animals to prepare them to meet the problems of life.

In the interpretation of animal sexual activity, we have no way of probing into the conscious or subconscious mind of the animal in order to determine whether its behavior is subjectively sexual. We can only watch the way the animal behaves, and where that behavior involves the sexual organs in a sexual way, we have to consider that that activity is sexual behavior.

Sexual behavior in dogs and cats seems to start considerably before puberty. Puppies and kittens of either sex, as young as three months of age and even younger, have been noted to mount each other in male copulative fashion and to engage in suggestive sexual movements. Both male and female exhibit the male pattern of adult sexual behavior. It is significant that the female pattern of adult sexual behavior is never exhibited by the female prior to puberty. The reason for this behavior has been attributed to the fact that male sex hormones appear in both males and females very early in the prepuberal stage of development, whereas female sex hormones do not appear until puberty. But this hormonal explanation is inadequate. While it can to a certain extent explain the male pattern of the female puppy or kitten, it cannot apply to the male because castrated puppies or kittens will behave in a similar manner. It is generally considered that this activity in prepuberal dogs and cats assumes the nature of play.

Animals do not play because they are young and frolicsome, but rather they have a period of youth in order to play. In this period they learn to hunt, fight, protect themselves and so on. The higher the mental development of the animal, then generally speaking, the longer will be its prepuberal period because it simply needs more time to learn the many things that are necessary in order to cope with the problems of life. From this point of view, the frankly sexual play of prepuberal dogs and cats would seem to be nothing more than a youthful preparation for later requirements in life.

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P. W. PENNOCK, B.S., D.V.M. and A. J. CAWLEY, D.V.M., M.V.Sc.

Small Animal Division of Medicine and Surgery
Ontario Veterinary College
Guelph, Ontario

FIGURE 1

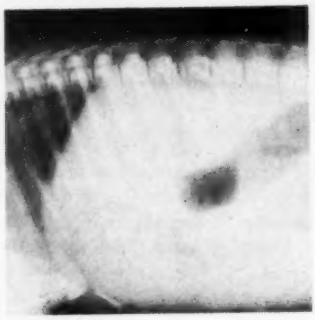


FIGURE 2

Trauma of the vertebral column in dogs

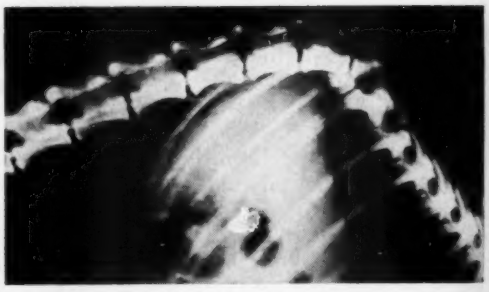


FIGURE 3

FRACTURES, fracture dislocations, and dislocations of the vertebral column of dogs are quite common, but reports of such conditions are relatively rare in veterinary literature. With the exception of Hoerlein's recent discussions,[2,4,5,6,7,8] reports on this subject have been largely the work of European writers.[1,9,11,12] McGrath[10] has given an excellent discussion of the pathology of the vertebral column.

Injuries to the vertebral column are of particular importance when they cause compression of the spinal cord, with resultant neurological complications. Because of the obvious severity of some of these injuries as demonstrated by clinical examination, and especially when clinical findings are confirmed by radiography, euthanasia is generally advised. Some workers cited above have advocated surgical intervention in a number of these cases. It is in support of this type of treatment that this report is presented.

On August 18, 1958, a female, crossbred Terrier was presented for examination. The referring practitioner had diagnosed "broken back" and sent the animal to the Ontario Veterinary College, Small Animal Clinic, for confirmation of the diagnosis.

Fig. 1. Over-riding dorso-ventral fracture dislocation of T12-13.

Fig. 2. Immediately after surgery, showing complete reduction and normal alignment.

Fig. 3. A compression fracture of T11 with over-riding of the fragment. Notice the dye in the spinal canal halting about one and one-half vertebrae anterior to fracture, due to inflammation and hemorrhage.

The history revealed that on the day prior to admission the animal was dragging the right hind leg. The following day complete posterior paralysis was evident. Close questioning failed to reveal any injury which might have been responsible for the paralysis.

Clinical examination revealed paralysis of both hind limbs. The paralysis was of a spastic type, and the legs were thrust forward. Palpation of the vertebral column gave evidence of upward displacement and discontinuity of the vertebral column.

A radiograph (figure 1) confirmed clinical findings and demonstrated fracture-dislocation of the 12th and 13th thoracic vertebrae, with over-riding of fragments.

It was decided to attempt to relieve the condition by surgical intervention. A guarded prognosis was made when discussing the case with the owner, and it was stressed that irreversible trauma to the spinal cord had probably occurred.

Surgical Technic

The animal was anesthetized with pentobarbital sodium, the operative site prepared and the animal placed on the operating table in ventral recumbency. The skin and subcutaneous tissues were incised from the area of the tenth thoracic vertebra to the second lumbar vertebra. The fascia of the psoas muscles was incised and, using the handle of the scalpel, muscles were bluntly dissected away from the dorsal spines of the vertebrae until the fracture site was exposed. A periosteal elevator may also be used for the blunt dissection.

Fragments of the vertebral bodies were manipulated into normal apposition by inserting a periosteal elevator between the 12th and 13th thoracic vertebrae and using it as a lever.

When the fragments were in position, holes were drilled through the dorsal spines of T11-12 and T12-13. Simple interrupted sutures of black silk were then passed through these holes and tied firmly in an attempt to hold the fragments in apposition. It was believed that the normal muscle pull would exert most of the pressure necessary to achieve impaction and fixation. The lumbodorsal fascia was sutured with interrupted sutures of no. 00 chromic catgut. The skin was sutured with no. 00 black silk, using the vertical mattress technic. A radiograph (figure 2) taken immediately after surgery, revealed complete reduction of the fracture, with normal bone alignment.

After the operation, antibiotics were administered for five days as a precautionary measure. In an attempt to reduce any edema which might be present in the cord and associated structures at the fracture site, hypertonic glucose (50%) was administered intravenously for four days. The rectal temperature remained well within the normal range during the entire postoperative period.

The dog showed varying degrees of bowel stasis for about one week after the operation. The abdomen would become bloated; this was usually relieved spontaneously, but on one occasion, it was necessary to give an enema. At the time of discharge, bowels were moving normally.

Eight days after surgery, the dog was standing, but unsteady. On the ninth postoperative day, the dog walked. It continued to improve and was discharged with no obvious locomotor impairment 18 days after admission to the clinic.

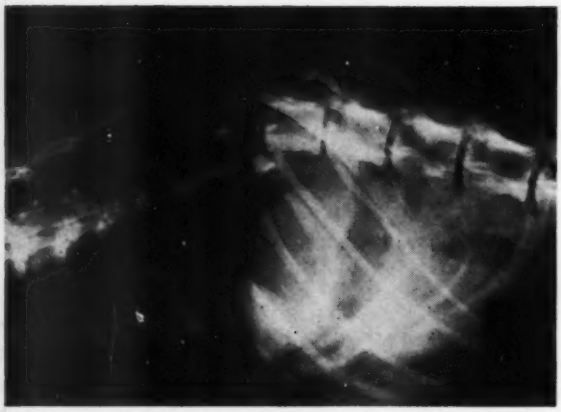
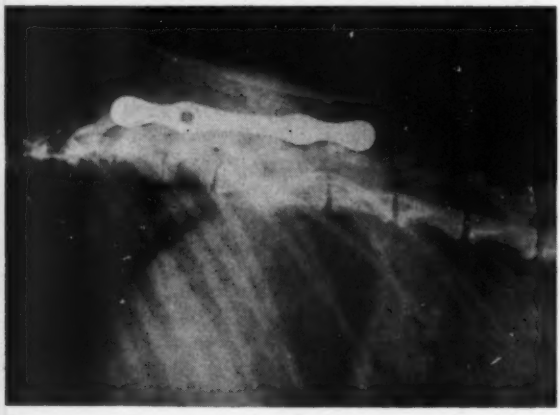


Fig. 4. Myelogram, ventro-dorsal, showing stoppage of dye anterior to fracture site.

Fig. 5. Reduction of the fracture and fixation with a vitallium plate.



Case 2

On July 8, 1957, a male, French Poodle, was presented at the clinic for examination. A diagnosis of vertebral fracture had been made by the veterinarian referring the case. The dog had been struck by an automobile one week previously, had recovered from the initial shock of the accident, and was alert in its demeanor. Complete posterior paralysis was evident, but pinching of the foot pads of the hind feet produced a slight pedal reflex. It was this evidence of cord function which led to the animal being presented for surgical intervention. It should be pointed out here that a pedal reflex is an unreliable sign as far as prognosis is concerned; it is well established that this type of reflex can be elicited from animals which have undergone a complete transection of the cord.

Radiographic examination revealed a compression fracture of T11, with the posterior fragment over-riding dorsally (figure 3). Myelographic studies were carried out (figure 4), and the contrast media (which was injected into the cisterna magna) stopped 1½ vertebrae anterior to the fracture. This gave some indication of the forward extension of hemorrhage and inflammatory changes in the cord.

Surgical Technic for Fracture Reduction

Approach to and reduction of the fracture were similar to the procedure described for case 1. In the Poodle, fixation was accomplished by a metal plate and screws (figure 5). A plaster cast was applied around the chest to give additional suport. The immediate postoperative period was uneventful, and the animal was returned to the referring practitioner to convalesce. We were notified two weeks later that euthanasia had been performed.

Case 3

On the morning of October 7, 1958, a male hound, four months of age, was presented at the clinic shortly after having been struck by a car.

The animal was in a mild state of shock. Rectal temperature was 99.4 F. Extremities were cold to the touch. As the result of a fracture of a premolar tooth, there was blood in the mouth. Palpation of the limbs revealed crepitus in the midshaft region of the right femur. Palpation of the neck produced pain in the region of the first and second cervical vertebrae. The dog was paralyzed in all four legs.

Treatment to counteract shock consisted of 25 mg. of Demerol (Winthrop) intramuscularly, and a transfusion of 100 cc. of whole blood.

A radiograph (figure 6) taken shortly after the animal was admitted revealed a possible fracture of the odontoid process of the second cervical vertebra. On manipulation, there was excessive mobility at the junction of the head and neck; a dislocation was diagnosed. A short, spiral comminuted fracture of the right femur was also present. The placing reflex of the front legs was absent at this time.

The neck was immobilized with a plaster cast which extended from the occiput to the junction of the neck and shoulders.

On the day following surgery, the temperature was 99.6 F., but was within normal limits during the remainder of the animal's stay in the clinic. Antibiotics were administered as a precautionary measure for one week. After discontinuation of the antibiotics, vitamins were administered. As with the animal in case 1, hypertonic glucose was given intravenously for four days.

Three days after admission the animal could prop itself up on its front legs. Thirteen days after admission the dog was standing on all four legs, although unsteadily; the placing reflex was normal on the right side at this time, but was absent in the left front leg. The cast was removed from the neck on October 23, and the animal was walking quite well, with only slight visible impairment in the gait (both front and hind legs on the left side were lifted high when walking).

A radiograph of the neck, taken on November 7, 1958, revealed an apparently normal atlanto-occipital joint. During the radiographic procedure, an attempt was made to produce an abnormal extension of the joint, but this was not successful.

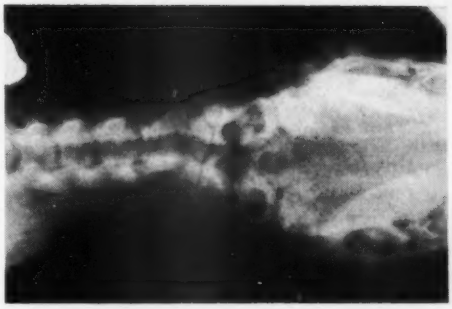


Fig. 6. Notice the deviation of the atlas from the expected normal angle of alignment with the occiput.

Fig. 7. Fracture of L7 with ventral displacement and ¾ in. shortening. There is also a fracture of the first coccygeal vertebra.

Case 4

A female Springer Spaniel, two years of age, was referred to the clinic on January 16, 1959, after having been struck by an automobile the previous day.

On admission, the animal was recumbent. It would not use its hind legs and great pain was evinced when they were manipulated. Rectal temperature was 101.8 F.

A radiograph (figure 7) showed a fracture of the seventh lumbar vertebra. A fragment of the bone was displaced ventrally, causing a shortening of three-quarters of an inch in the length of the vertebral column. Other radiographs revealed a slipped upper femoral epiphysis and a slipped distal tibial epiphysis.

No surgery was undertaken to reduce the vertebral fracture. The slipped femoral epiphysis was repaired with a Steinman pin; the slipped tibial epiphysis was reduced and a plaster cast applied from the stifle to the paw.

Pain was evident when intramuscular injections were made, but the animal made no attempt to draw the leg away. To quiet the animal, a tranquilizer was administered daily for six days.

On February 3, the animal was able to move the tail and both hind legs, but was unable to extend the right hind paw. The next day the animal was standing; it continued to improve in its walking except that it still knuckled over on the right hind paw. The animal was released to the referring practitioner on February 15, 1959, for continuation of treatment.

Summary

Four cases involving trauma to the vertebral column are described. They are presented to show that not all cases involving vertebral trauma and damage to the spinal cord are to be regarded as hopeless. Unless the damage to the cord is extremely severe, a reasonable length of time should be allowed to elapse to see what progress the animal makes toward regaining the use of its limbs. Certainly all cases of trauma to the spinal cord warrant a guarded prognosis, and the client should be given a complete explanation of the factors involved.

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Dr. W. F. Irwin Killed in Alaska

The shocking death of Dr. Bill Irwin, Tulsa, Oklahoma, while on a hunting trip to Alaska marks the loss of another of our profession's truly great leaders. Doctor Irwin died in a freak ground accident at one of the airports in the bush country. The wing of a small plane accidentally struck Doctor Irwin, causing death.

Funeral services were held at South Minister Presbyterian Church in Tulsa, Thursday, September 17.

Although the family has requested no flowers, contributions to the Veterinary Research Fund would certainly be a fitting tribute to this veterinarians veterinarian.

Doctor Irwin's influence on organized veterinary medicine marks a chapter of professional cooperation at the local, state and national level that will not be erased. His broad viewpoint and understanding approach to the problems of the profession will provide a guidemark of professional conduct for thousands of younger veterinarians.

Here each month are published ideas, suggestions and comments picked up by VM reporters.

Small Animal Clinic

Practice Tips From Wyoming

A discussion of practice problems at the Wyoming State Meeting, June 14, yielded the following comments on small animal practice.

In handling an unruly cat, Dr. Douglas McLean, Riverton, recommends that ties be placed on the forelimbs (the ties from the back legs are attached to the table) and holding the ties on the front legs the cat is flipped over on its back in preparation for administration of an intravenous anesthetic.

Dr. William H. Breckenhuer of Norden Laboratories suggests 1 cc. of pentobarital sodium be injected into the lungs for anesthesia of wild and unruly cats. Dr. Mino Ota, Lovell, reported that he uses 1 cc. pentobarbital sodium intrathoracically in cats and that this amount will take effect in five to ten minutes. On the same subject, Dr. Kenneth W. Smith, Colorado State University commented that injection of barbiturates directly into the lung tissue of cats is undoubtedly irritating and should be avoided in favor of the intravenous route.

Other suggestions offered were foam rubber sheets cut into small pieces to place between the toes of a dog underneath a cast. Foam rubber bandages are also useful to secure traction.

Magic Marker, a commercial ink with a felt brush, has been found very useful for marking various items around the hospital.

Dr. W. L. Rollins, Newcastle, reported that in castrating cats he makes an incision over the scrotum at right angles to the length of the body so that both testes are removed from one incision. After withdrawing the testes, the cords are tied together.

Iron Deficiency Anemia

A diagnosis of iron-deficiency anemia cannot be disregarded because the red cell index or appearance on stained smears is normal. Ernest Beutler, M.D., of the University of Chicago explains that, although hypochromia and microcytosis usually accompany iron deficiency, both count and appearance of red cells may be normal in slightly anemic patients.—*Ann. Int. Med. 57:313, 1959.*

A Point of Ethics

The Council of the South African Veterinary Medical Association, supported by the Annual General Meeting of the Association held at Onderstepoort, August 28, 1958, decided that it is unethical for any registered veterinarian employed by any animal welfare society, cooperative society or any other employer who is not himself a registered veterinarian, to allow any fees collected in return for professional services rendered to pass to the employer.

In such cases the registered veterinarian

is enabling an unregistered person (the employer) to render professional veterinary services through himself, *i.e.* he is "farming out" his professional status. According to legal advice it is immaterial whether payment is voluntary or not.

Warning is given that in the future any registered veterinarian who permits such action shall be deemed to have "permitted himself to exploited in a manner detrimental to the public or professional interest" and shall be liable to disciplinary action. The responsibility in this connection lies with the veterinarian, not the employer.

Supersonic Diagnosis

The *Maine Veterinarian* reports that Dr. McClure Day entered the field of supersonics recently when he diagnosed the peculiar case of a two year old Poodle. This dog was unusually steady and loved to ride in automobiles.

Without apparent reason, the animal suddenly became very agitated when the car began to move, barking steadily and watching the accelerator pedal.

Two questions were asked: Do you have a new car? The answer was *yes*. "Do you have an automatic transmission?" The answer again was yes.

Diagnosis: High frequency sounds from torque converters are too much for a dog's ears.

Treatment: Sedatives and cotton in the ears of the animal may help but the dog had best be consulted the next time the owner buys a new car.

Feather Conditions of Pet Birds

Loss of feathers and irritation of surrounding skin most any place on the body are typical observations in feather problems. Etiology is generally nutritional, endocrine, parasitic, inactivity or nervousness.

If external parasites are involved this condition must be controlled first. Apparent lesions are treated with antibiotic ointments and steroids. The patient may be exposed to ultraviolet light from a distance of three feet for one minute twice daily for 30 days. Oral therapy consists of 1/4 grain thyroid tablet crushed and powdered over the feed daily, vitamin powder added to the feed or pediatric drops at the rate of one drop b.i.d. Other forms of oral therapy are 25 mg. capsule of benadryl added to four ounces of water and used as drinking water and one drop of Lugol's solution added to the drinking water daily for one week and then one drop twice a week.

Patients are confined to the cage and a cardboard restraint collar used to prevent further self inflicted damage.—*R. M. Stone D.V.M., Michigan State University Veterinary Conference.*

Contrast Medium for X-Ray

Gastrografin, an organic iodide in an aqueous solution, should be used instead of barium sulfate for roentgenographic examination of the gastrointestinal tract when prolonged retention within fistulous tracts, body cavities, or the bowel lumen is anticipated and when accidental aspiration may occur.

Gastrografin is superior in the diagnosis of tracheoesophageal and bowel fistulas, pyloric stenosis, duodenal ulcer, bleeding foci in the gastrointestinal tract, and bowel obstruction. The contrast medium is palatable and has no toxic effects.

Contraindications are iodide sensitivity, acute appendicitis, and complete bowel obstruction.—*Acta Radiology, 51:170, 1959.*

Antibiotics in Pancreatic Fluid

Levels of intravenously administered erythromycin and oleandomycin in pancreatic fluid are sufficient to inhibit susceptible organisms. Frederick W. Preston, M.D., Milton Silverman, Ph.D., and George C. Henegar, M.D., of Northwestern University and the Veterans Administration Research Hospital, Chicago, report that injected streptomycin is excreted in small amounts. Chloramphenicol is detectable after injection at pH 6 but not at pH 8. Intravenous Sigmamycin or tetracycline cannot be detected in pancreatic fluid.—*Arch. Surg. 78:810, 1959.*

Protect Your Financial Investment in Hospital Floor Covering

An article in the August 1959 issue of *Hospital Management* discusses floor maintenance, a problem familiar to the small animal hospital. Major manufacturers of maintenance materials for composition flooring have spent many thousands of dollars in research to provide institutions, hospitals, and the public with safe, longer wearing floor treatments at reduced costs. These materials, such as carnauba waxes, floor finishes, detergents, and polishes are continually being revised.

The application of these materials may be likened to the application of paint to the surface of wall areas. The paint is relatively inexpensive, approximately 35% of the total labor cost. The ratio of materials to labor is 46.45%.

Factors to be considered in rating floor materials are the cost relationship (installed); the resistance to oil, grease, and solvents; quietness; resilience; wear; and one of the most controversial subjects since the advent of vinyl tiles, the appearance without waxing. Numerical cost relationships installed reported by the 1958 *Year Book Issue* of *Buildings Magazine* are: asphalt-1, linoleum-1.14, vinyl asbestos-1.43, rubber-2.14, vinyl-2.29, cork-2.57.

Assuming that these figures represented dollars for an average room of 10 by 12 feet or 120 square feet, an asphalt tile installation would be $120. A vinyl tile installation would be $274. Multiply this by the number of rooms this size in your building and you have a sizeable investment in flooring. It must be protected.

Among the most common errors found today are inadequate schedules for removing all floor protection from the flooring. Faulty application and excessive use of wax and floor protective coatings are also common. A compound of hardened wax and dirt burnished together into the floor covering is not uncommon. The use of dirt incrusted polishing brushes causes further burnishing of surface grit in the floor material. Powder detergents do not dissolve thoroughly, and have a tendency to leave a crystal residue on floor surfaces and in between individual floor tiles.

Consideration should be given to the use of improved liquid and jelly detergents. Use of many of the damp-sweep-tools will provide and overcome the losses resulting from burnishing dirt into resilient flooring.

It is common knowledge that kerosene, naphtha, turpentine, carbon tetrachloride, gasoline, oils, greases, and other common solvents are natural enemies to asphalt tile. Compounds that contain oil should not be used on dust mops, nor should sweeping compounds that contain oils be used. Oil waxes and solvent type waxes shorten the life of asphalt tile. Clear water mopping on unwaxed asphalt tends to dull the floor. A cleaning with mild soap and a mild alkaline cleaner before using wax will dry on asphalt tile with a spotty unsatisfactory finish. Never use varnishes or lacquer on asphalt tile. Slip hazards on this material may be avoided by the use of a colloidal silica which has been added to many of the water type waxes. Two thin coats of water wax maintained properly are recommended for asphalt tile.

Daily maintenance of rubber tile by clear water mopping is recommended. If the colors in the tile tend to become dull, a mild scouring with an approved cleaner or abrasive cleaning powder and possibly steel wool, is recommended. Be sure that there are no solvents or alkalies in either the cleaning agents or waxes. Like asphalt tile the use of sweeping compounds containing oil should be prohibited.

Laboratory Animal Medicine

THE INCREASING NUMBER of new research laboratories in biology and medicine, and the enlargement of already established facilities has created an expanding opportunity for veterinarians.

Many directors of medical research have begun to realize that the development and maintenance of animal colonies are important basic factors in a general experimental program and cannot be dealt with properly by the individual investigator. They are seeking, as members of their staff, veterinarians who can contribute to the provision of satisfactory animals and the maintenance of conditions of housing, feeding and general or specialized care in conformity with experimental requirements.

The veterinarian may be in position to recommend to an investigator the type of animal that will best serve the needs of his experiment. His training and experience equip him to supervise the procurement of animals; and his knowledge of the problems of feeding, litter, pest and disease control tends to insure the research unit against the common ailments of laboratory animals, and outbreaks among them of communicable and epidemic disease. Considerable money, time and energy have been wasted by research institutions which lacked the working background of an informed veterinarian interested in contributing to the biological research in progress.

What does this burgeoning field offer to the interested practitioner in veterinary medicine? It puts to use the clinical experience and medical knowledge he already has. But further, it extends this experience and knowledge into an area concerned not only with some of the species he has already dealt with, but others with which he is not as familiar, in an environment favorable to the extension of his knowledge.

It may also afford an opportunity to teach in medical schools and to associate in stimulating professional activities with men versed in human disease as well as medical and paramedical research.

To the veterinary student who has just completed his formal training, it offers an opportunity to do postgraduate work at medical centers while helping maintain laboratory animals.

Salaries range from $6,500 to $12,000 per year, depending upon experience and responsibilities; however, some get less.

Plans are now under way to include information concerning laboratory animals in both required and elective courses at veterinary schools. Some schools invite practitioners in laboratory animal medicine to give lectures during the year; and in military circles, recognition that the veterinarian is especially equipped for this type of training, is represented by a new two year course in laboratory animal care being offered to military personnel only by the Armed Forces Institute of Pathology at Walter Reed Research Institute in Washington, D.C. beginning in the fall of 1959.

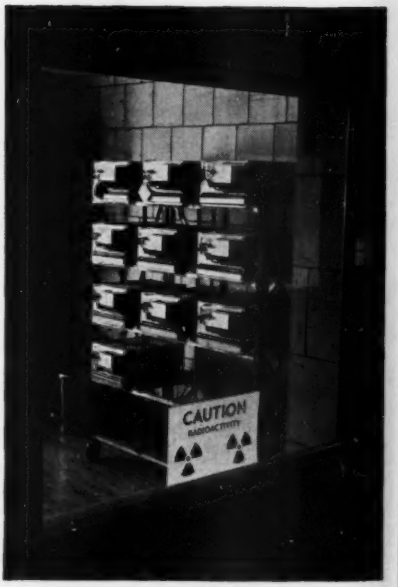
Simultaneously it is being urged that veterinarians take the leadership in providing demonstrations of good practices in laboratory animal care and medicine at veterinary and medical schools, and institutions of research. In this way, it is felt, people who are concerned with how laboratory animals are cared for in research will be accurately informed. Veterinary and medical students through exposure to such effective practices

Laboratory Animal Medicine

in animal care will also come to see and appreciate the advantages gained as a result of the application of the specialized knowledge of the veterinarian.

Veterinarians wishing further information may write to the American Board of Laboratory Animal Medicine, a specialty board approved by the A.V.M.A. Robert Flynn, D.V.M. is secretary. The address is P.O. Box 299, Lemont, Illinois.

In addition, inquiries may be directed to the Animal Care Panel, formed among research scientists, veterinarians, and the producers and curators of laboratory animals for information on the production, care, management and use of laboratory animals. This organization publishes a quarterly journal, *Proceedings of the Animal Care Panel*, containing articles and items on the practices in the field. The Panel meets annually. Correspondence to the Panel may also be addressed to P.O. Box 299, Lemont, Illinois.—*Kirk Polking.*



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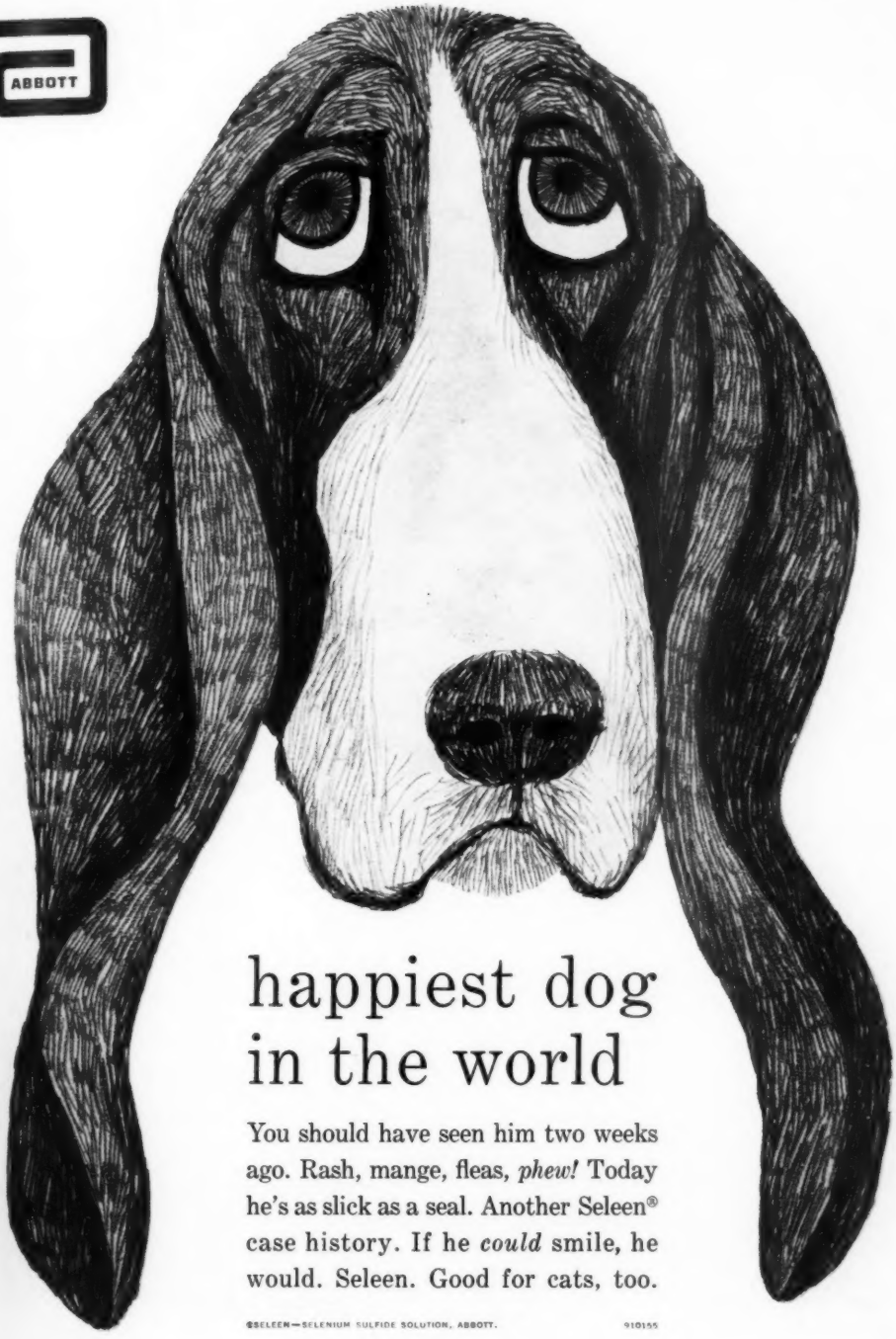

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Continued from page 512

engorged with erythrocytes. In tissue stains, the blood vessels of the lymph nodes stand out vividly with their distension of erythrocytes.

The mucosa of the upper air passage shows the most characteristic lesions of the disease. The mucosa is so thickened and swollen that probably in no other condition does one encounter such a livid, dark purplish-red hyperemia of the nasal septum, turbinates, sinuses, and the dorsal surface of the hard palate (fig. 4). The exudate grades through successive degrees from a mucous exudate to hemorrhagic to thick diphtheritic deposits in the final ulcerative lesions. This phase of the pathology is essentially pathognomonic.

Mucosa of the larynx and pharynx is usually reddened and hemorrhagic contiguous with the process in the posterior nares. The severity of the process varies from the presence of a few petechia on the tonsils to extensive ulceration and fibrinonecrosis of much of the pharyngeal mucosa.

The mouth lesions may consist of hemorrhages on the lower gum and tongue. Erosions and ulceration of the mucosa of the mouth and esophagus may occur but they are less common than with mucosal disease. The digestive tract, especially in the bowel phase of the disease, usually shows a gastroenteritis of varying degrees of severity. The mucosa of the abomasum may be diffusely reddened and ulceration may be prominent (fig. 5 and 6). Petechia and circumscribed hemorrhages are seen at times. Surface ulcers and erosions are found sometimes as far back as the cecum. The enteritis and hemorrhage in the digestive tract are correlated with the fetid diarrhea. The spleen, in our experience, has shown little enlargement. The hepatic lesions consist of perivascular lymphocytic infiltrations, which are more significant than gross lesions, although grayish foci may be seen beneath the capsule. Infiltrating cells surround the arteries, bile ducts, and veins except the central veins.

Many times the kidneys show little, grossly, although at times there are pale areas. Microscopically, the lymphocytic infiltration resembles that seen in the liver. The dense areas of cells are even reflected in the gross appearance of some kidneys. The mucosa of the urinary bladder frequently shows extensive lesions varying from erosions to thickened raised pink fibrinous to gray areas. The urine is blood stained, turbid, while albuminuria is more or less constant.

Lungs are usually relatively free of lesions in comparison with the upper respiratory tract. Sometimes edema and petechia beneath the parietal pleura are seen. Many times the heart is little affected except for some epicardial hemorrhages.

There is a consistent increase in the quantity of the cerebrospinal fluid. The cranial vessels are regularly engorged with blood, and encephalomyelitis is more or less regularly present in the course of the disease, but the inflammatory reaction varies in different cases. The cellular infiltration around the blood vessels takes place in the Virchow-Robin spaces, and it is especially noticeable around the blood vessels in the sulci of the meninges. Acidophilic inclusions in the cytoplasm of the neurons of the central nervous system have been reported by a number of workers.[22,23,7]

Stenius,[24] in a later report, doubts the specific nature of the cellular inclusions for MCF. He considers that the inclusions represent disintegration products of the tigroid substance. Sometimes there are somewhat similar pigmentation granules apparently to be found in apparently normal ganglion cells. In some cases, the inclusions represent aggregations of virus elements in other degeneration products caused by intracellular virus reproduction.

Daubney and Hudson[8] transmitted MCF in series in rabbits with characteristic lesions in the liver, kidney, brain, and cord. MacKinnon and LeSouef[25] reported viral lesions in the brain of rabbits inoculated with suitable material. The work at North Dakota produced encephalomyelitis in rabbits and yet the transmission experiments gave rather indifferent results, for the material seemed to be of low virulence.

Diagnosis

In the early stage of the disease, the symptoms may not be sufficiently character-

Fig. 4. Characteristic lesions nasal septum and lymph nodes.

istic to permit a diagnosis of MCF even by an experienced veterinarian. The protean character of the disease, moreover, is such that it may very well present some difficulty in diagnosis when the first case in a herd is confronted. Some of these difficulties were obvious in the field investigations in Kansas and North Dakota, where isolated herds were seen on long field trips and out of the regular community of the veterinarian.

Diagnosis presents little difficulty when the characteristic symptoms are considered: the extreme temperature elevation, the typical lesions, and the high mortality with the recurring losses at irregular intervals. The ordinary infectious keratitis does not kill cattle. The characteristic symptoms, lesions, and history readily serve to differentiate MCF from herd diseases like anthrax, blackleg, prussic acid poisoning, and hemorrhagic septicemia.

Our observations on the differential diagnosis of the mucosal diseases of cattle correspond to those of Pritchard.[8]

The high case mortality of MCF differentiates it from upper respiratory disease and necrotic rhinitis and tracheitis in which the morbidity is much higher in the herd than with MCF. In neither of those diseases nor in mucosal disease are the nervous signs observed as in MCF. Erosions of the dorsum of the tongue as in mucosal disease are rare in MCF. The corneal opacity so constant in MCF is uncommon in mucosal disease. The hemorrhagic necrosis of Peyer's patches in the bowel in mucosal disease and rinderpest is absent in MCF.

A field investigation by an experienced veterinarian is the logical procedure in dealing with one of the above problems. Movement by truck (or otherwise) of an animal sick of any transmissible disease is, in general, to be discouraged. To date, no recognizable dissemination of MCF has resulted from the movement of cattle from infected herds by truck to an abattoir for emergency slaughter or to a laboratory for diagnostic examination. Moreover, the virus of the disease is extremely labile and soon deteriorates outside the body of the animal host. Most of the materials collected on the farm from sick animals and those which have recently died have, in general, proved unsatisfactory for diagnostic procedures. Blood, viscera, feed, and stomach contents have consistently given negative results in outbreaks of MCF. A bovine head accompanied by a thorough history of the outbreak is probably the minimum specimen suitable for laboratory examination.

Control

Efforts directed toward the control of MCF and the prevention of further losses have offered little hope of success until

Fig. 5. The intense hyperemia of the abomasum.

Fig. 6. The bowel form of the disease.

recently. Hemorrhagic septicemia biologics have been tried with no beneficial effects. In the past, owners have in desperation depopulated their farms of cattle. Many have gone out of the cattle business because of the slow persistent onslaught of the disease. They have been encouraged to dispose of the cattle under permit from a livestock sanitary official for slaughter under federal inspection. Except for visibly sick animals with elevation of temperature or other manifest symptoms, suspect cattle have, under such conditions, passed meat inspection.

Such cattle should not be sold through a community sale because of the possibility that some of them may be virus carriers. The disease has not recurred after herd dispersals and farm restocking except on the "P" farm, where the sheep were retained. Separation of sheep from cattle seems to be the only proved method of checking further progress of this bovine enzootic.

Treatment of animals sick with MCF has not been effective. This virus disease condition has not responded to either sulfonamide therapy or to antibiotics.

In all cases of Blazhevich's[19] investigations in 18 outbreaks of MCF, cattle were pastured or stabled with sheep. In a few villages some cattle were segregated from sheep and remained free from the disease. Infected cattle recovered when they were segregated from sheep and the disease did not spread to healthy, contacted cattle. In like manner, segregation of the sheep from the cattle on the "L" farm in North Dakota appeared to control MCF.[26] It had persisted there from about 1928 until probably 100 head of cattle had died over a period of years.

Summary

Malignant catarrhal fever is a highly fatal encephalomyelitis of cattle, no doubt viral in character. It has been studied in Africa and Europe and has been encountered from time to time in various areas of this country. While many cases of the disease occur sporadically, the outbreaks seen in the course of these investigations assumed the form of prolonged herd enzootics. The infectious agent is present in the blood and tissues of infected cattle and can be transmitted to other cattle by inoculation of blood and lymph gland material. Consistent transmissibility of the disease with the development of a leukopenia and the absence of bacterial infection indicates the likelihood of a virus as the causative agent.

Morbidity is low. Usually only one or two animals in a herd are sick at a time. While recovery has been reported by some workers, the case mortality in this study has been high. Under natural conditions, it appears that sheep maintain the infection and disseminate it to cattle, although the clinical disease does not occur in sheep. The incubation period seems to be variable and prolonged.

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TRANQUILIZATION IN SWINE AND SHEEP

H. E. HEDLUND, D.V.M. and J. D. LITTLE, D.V.M.

Wahoo, Nebraska

To DATE, little concrete clinical information exists on this subject. Recently published papers relate primarily to bovine, equine and canine applications of psychosedative drugs.[1,2,3,4,5] Successful tranquilization of swine and sheep requires precise interpretation of certain dose-response differences. Our clinical observations of these matters over the past three years comprises the substance of this report.

Species Differences

We observe a gross dissimilarity in dosage requirements between swine and sheep. These differences seem to be governed by species susceptibility to tranquilizers and are modified by a number of environmental and physical conditions. Paradoxically, sheep require far greater relative doses than do cattle, though both are ruminants. Swine are quite sensitive to these drugs in comparison with the dog. Awareness and attention to these species dose-response variations must be a primary concern of those in general practice.

Drug Potency Ratios

The amount of drug required to induce equivalent degrees of tranquilization in a given animal varies according to the drug used. Trilafon (Schering) is approximately three times as effective, milligram for milligram, as Compazine (S.K.F.), some seven times the potency of Thorazine (S.K.F., Pitman-Moore) or Diquel (Jen-Sal) and 20 times the strength of Sparine (Wyeth) or Paxital (Warner-Chilcott).[6]

Available literature suggests there are only minor qualitative differences between responses induced by the various phenothiazine tranquilizers. Our experience supports this generality.

Tranquilizers in Swine

We prefer and strongly recommend intravenous administration for general clinical use. Sedation is achieved in three to five minutes at minimal dosage and the response is consistent in nature and degree. Intraperitoneal injection is suggested as the best alternative route. Subcutaneous administra-

tion (behind the ear) and intramuscular injection (medial aspect of the ham) require less restraint but do not always produce a consistent, predictable response.

Calculation of Dosage

Warm weather and high humidity are known to elevate body temperature.[7] These conditions also considerably enhance the sedative effects of phenothiazine tranquilizers.[8] Elevated environmental temperatures have been shown to reduce the anti-shock protective effect of these drugs; possibly a pharmacological corollary.[8] To the clinician, these facts suggest that excitement or excessive muscular exertion prior to or following injection may have similar effects and are to be avoided because of their thermogenic influence.

To compensate for the effects of warm weather and/or high humidity we routinely reduce manufacturers' recommended doses by one-fourth to one-third. In well finished shoats or mature sows and boars, an additional 25 to 30% reduction should be made.

Indications

Tranquilizers have eliminated the management problems of pre- or post-parturient hysteria in sows. This bit of medical ledgerdemain has been impressive to our clientele. Nervousness, aggressiveness towards man, refusal to suckle young, cannibalism and the pain of engorged mammae are specific manifestations of this syndrome relieved by tranquilization. We consider tranquilizers an ideal restraint for manual relief of dystocia and as preanesthetic sedation for cesarean section. Little, if any, tranquilizer crosses the placental barrier. We have never observed anesthetic depression of newborn pigs since switching to perphenazine plus local anesthesia of the operative site.

If general anesthesia of the sow is desired we use intravenous perphenazine 30 to 45 minutes prior to intravenous pentobarbital. This preanesthetic sedation reduces amount of the barbiturate required for surgical anesthesia by about fifty percent.

Tranquilization of the boar provides restraint for removal of tusks, scirrhous cords, castration (straight or cryptorchid) and correction of herniation. The anti-shock protective effect of perphenazine is apparent in porcine surgery although we have no objective means of measuring such action in the field.

Tranquilizers in Sheep Practice

In sheep, intramuscular injection is the only practical route of administration. We use a 50 mg. dose of perphenazine (or equivalent dose of another ataraxic) in the adult ewe or ram and 20 to 25 mg. in 60 to 90 pound feeder lambs. We are still amazed at the high dosage required by sheep. This 50 mg. dose in a 150 lb. ewe will induce comparable sedation in an 800 lb. cow.

Indications

The true psychosedative activity of tranquilizers, their ability to alter abnormal behavior patterns, is strikingly demonstrated in three flock management problems.

The orphan or "bummer" lamb problem has been eliminated by these drugs. We advise the owner to select a good milking ewe with a single lamb or one who has just lost her lamb. If two lambs are put on a ewe they should be the same age. The ewe is injected and lambs are given to her after a few hours. Unless she is still sleepy from the sedative effect, she will almost immediately claim and nurse them. If the ewe is still indifferent, withhold lambs another six to eight hours. The same procedure is effective in the case of ewes that refuse to claim their own lambs.

Tranquilizers reduce fatigue, mild shock and shrinkage due to transportation and will hasten adaptation of feeder lambs to new pasture or to feedlots. We administer 25 mg. perphenazine (Trilafon—Schering) to feeder lambs weighing 60 to 90 lb. either 12 hours prior to shipment or upon arrival. After long trips control groups appear dazed and seem to be in mild shock. Treated animals readily walk off cars and will eat and drink normally.

Empirically, we successfully use light doses of tranquilizers (25 mg. perphenazine, or its equivalent) plus 40 mg. prednisone, as supportive therapy in "pregnancy disease" in ewes. Fatigue, shock, hypoglycemia and other stress factors indicate this symptomatic therapy.

Summary

Differences in species sensitivity to psychosedative phenothiazine derivatives are discussed.

Optimal dosage of these drugs in swine and sheep is influenced by these differences. Environmental temperature, body temperature, humidity, degree of fat covering and possibly other factors affect the heat regulation mechanism. All these factors enhance in some way the pharmacological effects of tranquilizers.

Reversal of abnormal maternal behavior patterns is a clinically useful demonstration of true tranquilization.

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Immunization Against Hog Cholera

F. B. ANDERSON, D.V.M.
Kansas City, Missouri

ANTIBODY CONCENTRATE (Antrate HC—Armour; or Seratrate—Corn States) is a new concept in hog cholera immunization. It is the greatest major improvement in this field since the inception of the old "whole blood" hog cholera antiserum pioneered by Drs. Niles, Dorsett, and McBride.

Preserved hyperimmune antiserum collected from hyperimmune swine is fractioned.

It is believed that the dosage of hog cholera antiserum usually recommended and used with modified hog cholera vaccines will not provide immediate protection against a natural exposure to a virulent type hog cholera virus, and therefore, the accepted benefit derived from hog cholera antiserum is largely due to the stabilizing effect of other antibodies which normally are present at relatively low levels.

Hog cholera antibody concentrate is a solution of the globulin fractions of plasma derived from hyperimmune hogs. It is processed in such a manner that the hog cholera antibody content is at least twice that of hog cholera antiserum and the content of the other antibodies is approximately 2½ times that of serum. Therefore, it is a more balanced antibody preparation than standard hog cholera antiserum.

Despite the high antibody content per unit volume, antibody concentrate will not interfere with immunity being produced by vaccines or virulent virus. As a type of product, it can be compared with human gamma globulin. It differs in that it is less refined than the pure gamma fraction, but it contains a high level of antibodies known to be responsible for passive immunity in swine diseases, particularly hog cholera.

An additional advantage of antibody concentrate is that in the event of a national emergency, this product can be lyophilized and stored in the dry state at room temperature indefinitely. In the dry form, tremendous quantities can be stored in a relatively small space. As the need arises for this product, the lyophilized material can be rapidly dissolved in sterile (distilled) water and prepared for distribution and use.

Antibody concentrate has official USDA approval for use in swine at half the approved dose of standard hog cholera antiserum for farm vaccination, for sale barn, and for protection during interstate movement.

Antibody concentrate is designed for the busy practitioner and available only to the Graduate Veterinarian. Bulk and weight have been reduced 50%. More pigs can be handled with standard equipment. Decreased volume lessens tissue trauma at the site of injection. Shock producing blood proteins have been removed.

Sulfur-35 labeled phenothiazine was used in this experiment to investigate the differences in effectiveness against Heterakis gallinae *and* Ascaridia galli. *Average uptake of phenothiazine was seven times greater for* Heterakis gallinae. *A possible explanation of the high and low efficacy of the drug against these parasites is suggested by this work.*

Comparative Uptake of Phenothiazine

by ASCARIDIA GALLI and HETERAKIS GALLINAE in VITRO

STUART E. KNAPP, Ph.D., B.S., M.S., DEAN S. FOLSE, D.V.M., B.S., M.S., H. C. MOSER, Ph.D., B.A., R. H. McFARLAND, Ph.D., A.B., B.S., Ph.M.

Kansas State University
Manhattan, Kansas

PHENOTHIAZINE is an effective anthelmintic for many but not all species of parasites. Against *Heterakis gallinae* it has been reported nearly 100% effective;[1] yet against *Ascaridia galli*, the reported efficacy was 56%.[2]

The uptake of phenothiazine, *in vitro*, by Ascaridia has been measured with S^{35} labeled phenothiazine.[3] Using a colorimetric procedure, *in vitro*, measurements were made for Heterakis.[4] The efficacy appeared to be related to uptake of the drug.

Experiments reported here were to determine: (1) the quantity of phenothiazine taken up by male and female *Ascaridia galli* and *Heterakis gallinae* exposed *in vitro* to a known concentration of phenothiazine suspension for a given time and (2) the quantity of phenothiazine taken up by male and female Ascaridia exposed *in vitro* to a known suspension of the drug for different time periods.

Materials and Methods

Sulfur-35 labeled phenothiazine was prepared by heating a mixture of diphenylamine, elemental sulfur containing S^{35}, and a small quantity of iodine as a catalyst. The temperature of the mixture was increased slowly until the reaction was completed as noted by the cessation of H_2S evolution. The final temperature was about 190 C. The reaction was carried out in the presence of an inert atmosphere of nitrogen which also served as a gas to sweep out the H_2S that evolved. The H_2S was trapped in a solution of sodium hydroxide. The crude product of phenothiazine was purified by vacuum sublimation, and the sublimed material was treated for radiochemical purity by paper chromatography. The purified product had a specific activity of approximately 0.17 μg/mg.

Aqueous suspensions of the labeled

phenothiazine were made as follows: 40 mg. of phenothiazine was ground with 40 mg. of commercial detergent (Tide), and the ground mixture was stirred into 20 ml. of normal (0.89%) saline. The suspension was allowed to stand. Repeated measurements showed that 13% of the phenothiazine remained in suspension after 30 minutes. After two hours, 5.7% of the phenothiazine was still suspended. The pH of the suspensions was 6.7 ± 0.5.

Mature worms, removed from the small intestines and caeca of freshly killed chickens, were rinsed with saline and stored several hours in 0.89% saline at 40 C. Worms of both species were placed in the aqueous phenothiazine suspension for two hours. The suspension was stirred just before the worms were placed in it. In a second experiment, the uptakes of phenothiazine by male and by female *Ascaridia galli* were determined for exposure times of ½, 1, 1½, 2, and 24 hours.

Radioassay of S^{35} labeled phenothiazine was made by counting $BaSO_4$ samples precipitated from oxidized worms. Each worm was oxidized in a 22 ml. Parr Bomb,[5] and the resulting sulfate, plus 20 mg. of added sulfate carrier, was separated by chromatographic technics.[6] Barium chloride was added to the separated sulfate, and the precipitate was mounted on filter paper for counting. Uptake of phenothiazine was calculated by comparing the counting rates from worm samples with those from the oxidation of known weights of the labeled phenothiazine used in making the suspensions.

Statistical analyses were made using the t-test. The significance given by Cramer[7] is as follows:

* = almost significant 1% p=5 %
† = significant 0.1% p = 1 %
†† = highly significant p = 0.1%
where p = the probability of obtaining by chance so great a difference as that observed.

Results

The results of the experiments which compare males and females of both species are summarized in table 1. The results summarizing the exposures of male and female Ascaridia for varying time periods are given in table 2.

Discussion and Conclusions

Heterakis gallinae had an average uptake of phenothiazine (μg phenothiazine/mg worm) nearly seven times as great as that of *Ascaridia galli*, although the body weight of Ascaridia was 120 times as great as that of Heterakis. Statistically this difference is highly significant.†† In both species, the males appeared to contain more phenothiazine than did the females. Statistically this difference was highly significant†† for Ascaridia but not significant for the number of Heterakis tested. If a similar difference between uptake by small and large worms occurs in the vertebrate host under normal conditions, this may explain the high and the low efficacy of the drug for Heterakis and Ascaridia, respectively.

The average uptake (μg drug/mg worm) of phenothiazine by Ascaridia was $0.224 \pm$

TABLE 1. Uptake of S^{35} Labeled Phenothiazine by Male and Female *Ascaridia galli* and *Heterakis gallinae* Exposed *in vitro* for Two Hours to a Suspension of Phenothiazine

Treatment Group	Average Total Uptake of Phenothiazine (μg)	Average Worm Weight (mg)	Average Uptake of Phenothiazine (μg/mg)
Ascaridia galli	12.6	63.80	0.224 ± 0.010
Males (11)	9.6	40.09	0.261 ± 0.015
Females (11)	15.5	87.50	0.187 ± 0.015
			Diff $= 0.074 \pm 0.021$ $t_{20} = 3.52$
Heterakis gallinae	0.80	0.53	1.540 ± 0.138
Males (12)	0.64	0.40	1.743 ± 0.178
Females (10)	0.99	0.73	1.298 ± 0.197
			Diff $= 0.445 \pm 0.265$ $t_{20} = 1.57$

Numbers in parentheses represent number of worms tested.

0.010 which agrees with the value given by Lazurus and Rogers[3] using a similar measurement technic.

The results in Table 2 show that as exposure time increased, drug uptake increased. The anthelmintic effect in the vertebrate host is exerted before the 24-hour time limit of this experiment. However, all worms tested showed motility at the time they were removed from the suspension. As in the previous experiment, the males contained greater quantities of the drug per unit weight than did the females in all but the least and the greatest exposure time trials. This difference was statistically significant.††, *, †† It should be noted also that the males weighed approximately half as much as the females. After 24 hours, the females contained as much phenothiazine as did the males.

Acknowledgment

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This report is contribution no. 172, Department of Veterinary Medicine; no. 71, Department of Physics; and no. 583, Department of Chemistry, Kansas Agricultural Experiment Station, Manhattan, Kansas.

Doctor Knapp is now in the Department of Veterinary Medicine, Oregon State College, Corvallis.

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TABLE 2. Comparison of Phenothiazine Uptake Measured by S^{35} Labeled Phenothiazine by Male and Female *Ascaridia galli* Exposed *in vitro* for Different Lengths of Time

	Treatment Group	Average Total Uptake of Phenothiazine (μg)	Average Worm Weight (mg)	Average Uptake of Phenothiazine (μg/mg)
	30 minutes exposure	2.96	49.30	0.0695 ± 0.0111
A	Males (5)	2.63	35.00	0.0903 ± 0.0179
	Females (5)	3.29	68.00	0.0486 ± 0.0043
				Diff = 0.0417 ± 0.0184 t_s = 2.27
	60 minutes exposure	4.03	46.15	0.1002 ± 0.0086
B	Males (5)	3.52	29.10	0.1228 ± 0.0057
	Females (5)	4.73	63.00	0.0076 ± 0.0067
				Diff = 0.0452 ± 0.0088 t_s = 5.14††
	90 minutes exposure	5.91	41.63	0.1573 ± 0.0183
C	Males (5)	4.89	26.80	0.1924 ± 0.0279
	Females (5)	6.92	56.50	0.1221 ± 0.0101
				Diff = 0.0703 ± 0.0296 t_s = 2.38*
	2 hours exposure	11.50	55.90	0.224 ± 0.013
D	Males (11)	9.50	36.00	0.261 ± 0.015
	Females (11)	13.50	75.60	0.187 ± 0.015
				Diff = 0.074 ± 0.021 t_{20} = 3.52††
	24 hours exposure	33.39	37.19	0.869 ± 0.061
E	Males (5)	21.46	27.60	0.795 ± 0.064
	Females (5)	45.30	47.00	0.942 ± 0.098
				Diff = 0.147 ± 0.017 t_s = 1.26

Numbers in parentheses represent number of worms tested.

t-test:

Groups Compared	Difference	±	Standard Error	t_{18}-value	Significance
A-B	0.0307	±	0.0141	2.18	*
A-C	0.0878	±	0.0214	4.10	††
A-D	0.174	±	0.0171	10.18	††
A-E	0.799	±	0.062	12.89	††
B-C	0.0571	±	0.0202	2.83	†
B-D	0.124	±	0.0156	7.95	††
B-E	0.769	±	0.062	12.40	††
C-D	0.066	±	0.022	3.00	†
C-E	0.712	±	0.064	11.13	††
D-E	0.645	±	0.062	10.40	††

Practitioner's Laboratory

W. L. SIPPEL, V.M.D., Ph.D.

Florida Livestock Board
Kissimmee, Florida

EXAMINATION of URINARY SEDIMENT

MICROSCOPIC examination of the urinary sediment will sometimes locate the source of urinary tract disease and indicate the probable diagnosis.

Technic

1. A portion of the urine collected is placed in a 15 ml. conical centrifuge tube and spun at about 2000 r.p.m. for five minutes.
2. The supernatant is poured off and a drop or two of the sediment transferred to a slide. A cover slip is added taking care not to trap air bubbles.
3. Examine under low power with reduced light, obtained by racking down the condenser. Use the high dry lens for closer examination.

Urinary sediment is divided into organized and unorganized constituents. The former consists of cellular elements such as renal epithelium or leukocytes, the latter comprise crystals such as carbonates or oxalates.

Organized Sediment

Epithelial cells from the kidney tubules to the lower end of the urinary tract are found in the urine under certain circumstances. The size and shape of the cells will often enable one to differentiate the area from which the cells arose (fig. 1) although there is overlapping. Large numbers of bladder epithelial cells accompanied by leukocytes and bacteria are indicative of cystitis.

Leukocytes, erythrocytes, fibrin and tissue debris are also found on occasion. Parasite eggs, as the dog or swine kidney worm, or bacteria are also noted. Leptospires can be seen only under darkfield illumination.

Casts

Among the most pathologically significant constituents are urinary casts which are actual models of that portion of the renal tubule from which they came. They are formed from albuminous exudates from the blood vessels and covered by or contain epithelial cells, red or white blood cells, salts or hemoglobin. Hyaline (transparent), waxy (amyloid) and casts made of blood

FIGURE 1. URINARY SEDIMENT

Urinary sediment: 1, epithelia from bladder, (A) upper layer, (B) middle layer, (C) lower layer; 2, triple phosphate crystals; 3, pus cells; 4, epithelial scales; 5, bacteria; 6, urates; 7, spermatozoa; 8, red blood cells; 9, white blood cells.

turn page

or epithelial cells or mixtures of the above (*granular casts*) constitute the so-called "true casts." False casts consist of cylindroid forms composed of bacteria, fat, fibrin or salts.

The presence of a few casts is probably of little significance but when seen in large numbers they are an important indication of nephritis. In herbivorous animals the alkaline urine may dissolve most casts but in the acid urine of canines they persist. Calcareous casts are seen normally in the urine of ruminants and horses.

Hyaline, epithelial, granular or blood casts, when found in numbers, indicate renal inflammation or congestion. Epithelial and blood casts indicate acute renal disease whereas hyaline or granular casts indicate a more chronic condition. Albuminuria will usually accompany the appearance of these casts.

In cases of cystitis or pyelitis, Gram's stained smears of urinary sediment will often reveal the nature of the organism and aid in prescribing treatment. Pyelonephritis of cattle caused by *Corynebacterium renale* can be diagnosed in this manner due to their typical morphology. Antibiotic sensitivity tests on urinary sediment from cystitis and pyelitis cases will also be helpful.

The various crystals that make up the unorganized sediment are of little pathological significance. They are affected by the dietary constituents, pH of the urine, and interval of urinary retention. Gradwohl[1] provides excellent photographs or drawings of nearly all types, including some of sulfonamides and antibiotics. Some feel that triple phosphate crystals are indicative of cystitis in cattle but the criteria listed above are more reliable indicators. Large numbers of crystals do not necessarily indicate urinary calculi or even a predisposition to same. If calculi are present, other signs of their presence will be evident such as epithelial cells, leukocytes or erythrocytes.

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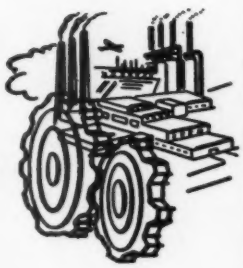

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Dr. George H. Hart, internationally known veterinarian and dean emeritus of the University of California School of Veterinary Medicine, died on August 2 in Woodland, California. He was 76.

He graduated from the University of Pennsylvania in 1903 and entered the government service immediately. From 1903 to 1908 he was assistant in bacteriology and pathology in the Bureau of Animal Industry, USDA. During this time he enrolled as a student in the School of Medicine of George Washington University and was graduated Doctor of Medicine in 1908.

Doctor Hart was the United State delegate to the International Veterinary Congress in Zurich, Switzerland, in 1937 and to the World Veterinary Congress in Stockholm, Sweden, in 1953. In 1949 he was the delegate of the National Research Council to the Pacific Science Congress in Auckland and Christchurch, New Zealand. In 1955 he was Fulbright lecturer in the University of Sydney, Australia. He was chairman of the Committee on Animal Health of the National Research Council from 1943 to 1945.

In 1938 the International Veterinary Congress awarded him its prize and in 1953 he was the recipient of the Borden Award of the American Veterinary Medical Association.

COMPARATIVE UPTAKE OF PHENOTHIAZINE

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Research Reveals Highly Effective Anthelmintic for Cattle

The results of recently intensive clinical research revealed an anthelmintic that is highly effective in cattle. Individual animals were confined in special stalls and administered different phenothiazine drench formulations for testing. All urinary and fecal excreta were recovered and each excretion was individually analyzed chemically to determine how much of the dose went into the digestive tract and amount of the dose available for killing worms. Dosages were given on an identical basis.

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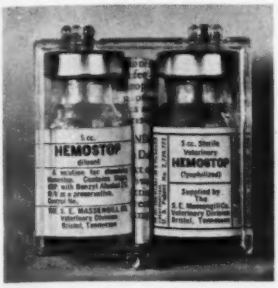

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1959 National LIVESTOCK LOSS PREVENTION Year

ASSOCIATED VETERINARY LABORATORIES
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Twenty-five words or less, $3.50 — minimum charge; additional words 10 cents each. Replies sent care VETERINARY MEDICINE. 50 cents additional to cover forwarding postage. Remittance must accompany order.

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Deadline for copy — 5th of month preceding date on issue.

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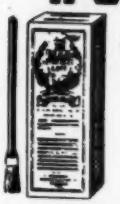

Quick relief for Bone, Bursal or Tendon Lameness

Single Bottle.....$2.00
3 and 1 free.....5.00
6 and 2 free.....9.00
12 and 4 free.....17.00
24 and 4 free.....28.00

CARTER-LUFF CHEMICAL CO.
Hudson, N. Y.

Wanted

VETERINARIAN: Position available. Veterinarian desired as associate in well established small animal practice. $500. a month first year. Will consider partnership, purchase or commission basis after first year. Address Dr. Glen S. Bolton, 2005 Yale S.E., Albuquerque, New Mexico.

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VETERINARIAN: Excellent opportunity to assist in well established practice—percentage equine. Florida license required. Address reply to Box 602, care VETERINARY MEDICINE.

CALIFORNIA STATE VETERINARY POSITIONS: Excellent opportunities in California State Government in either disease control and pathology or meat hygiene for graduate veterinarians with or without experience in practice. Salary range $556-676. Senior veterinary students eligible to apply before graduation. Liberal employee benefits. Write at once for further information. California State Personnel Board, 801 Capitol Avenue, Sacramento 14, California.

VETERINARIAN: Assistant wanted in Portland Dog and Cat hospital, Portland, Oregon. Address Portland Dog and Cat Hospital, N.W. 14th Avenue at Lovejoy Ramp, Portland, Oregon.

RESEARCH VETERINARIAN: Progressive manufacturer of feed medications and veterinary products with national distribution desires veterinarian as part of its expansion program to conduct therapeutic studies and critical evaluation tests. Advanced degree and some experience is preferred but not required. Please submit detailed resume to Box 603, care VETERINARY MEDICINE.

ASSISTANT VETERINARIAN: Busy small animal hospital, Boston area, needs veterinarian with Massachusetts license. Send qualifications and salary requirements. Address Box 607, care VETERINARY MEDICINE.

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ESTABLISHED MIXED PRACTICE: In Southern Minnesota. $28,000 gross. Priced at value of real estate, drugs, and all equipment. Reasonable terms. Address Box 611, care of VETERINARY MEDICINE.

MIXED PRACTICE: For sale in Nebraska. Includes real estate, equipment, drugs. Grossed over 27,000 in 1958. Terms can be arranged. Address Box 594, care VETERINARY MEDICINE.

VETERINARY PRACTICE: Both practice and property for sale in Ohio. Owner must retire. Address Box 595, care VETERINARY MEDICINE.

PREDOMINANTLY LARGE ANIMAL PRACTICE: For sale in Oklahoma. Hospital, equipment, and drugs. Annual gross, $65,000. Priced at $40,000 cash. Address Box 596, care VETERINARY MEDICINE.

MODERN LARGE AND SMALL ANIMAL HOSPITAL: Wonderful opportunity for two veterinarians. Located in fine climate, fast growing city. Ill health the reason for selling. Address Box 597, care VETERINARY MEDICINE.

BOOKS: The Dog book of books—Judy's Dog Encyclopedia—answers all questions on all dog subjects. Hundred books in one, new 3rd edition —$10. Judy Publishing Company, 2517 Michigan Boulevard, Chicago 16.

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SMALL ANIMAL HOSPITAL: Chicago suburb, long established, fully equipped small animal hospital for sale. Capacity 120 kennels, outdoor runs, three apartments on premises. Address Box 600, care VETERINARY MEDICINE.

ESTABLISHED MIXED PRACTICE: Practice in central Wisconsin for sale. Home, office, drugs, and equipment. Excellent opportunity. No blue sky. Address Box 601, care VETERINARY MEDICINE.

MIXED PRACTICE AND HOSPITAL: In midwest college town. $20,000 gross; could support two men. $5,000 to handle. Other interests. Write Box 604, care VETERINARY MEDICINE.

SMALL ANIMAL HOSPITAL: For sale. Hospital located in Denver, Colorado. For details, write Box 606, care VETERINARY MEDICINE.

MIXED PRACTICE AND SMALL ANIMAL HOSPITAL: 90% small animal. Excellent location in Western Pennsylvania. Real Opportunity. Address Box 609, care VETERINARY MEDICINE.

MIDWEST A.A.H.A. HOSPITAL: For lease beginning January 1, 1960, with option to buy. Established 27 years. Applicant must have ample small animal experience. Send all personal particulars in first letter. Reason for lease or sale, other interests. Address Box 605, care VETERINARY MEDICINE.

Situation Wanted

VETERINARIAN: Wants employment as a veterinarian. Graduate from University of Wroclaw, Poland in 1952. Six years experience in both small and large animal practice. Age 33, married. For details write Box 608, care of VETERINARY MEDICINE.

For Rent or Lease

MIXED PRACTICE ESTABLISHED 75 YEARS: For rent or lease in fully equipped, spacious building centrally located in large, southwestern Ohio city. Address Box 610, care VETERINARY MEDICINE.

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introducing the newest of the new in parasiticides

new-formula Phostix is safe for dipping cats, kills brown dog ticks

Here is the parasiticide small animal practitioners long have wished for. Cats may be dipped without danger in an emulsion of 1½ oz. Phostix to 1 gallon water. Extensive field trials have shown nontoxic Phostix to be highly effective against fleas and lice in cats and dogs, and against brown dog ticks. Its residual action persists for 2 to 4 weeks. The Phostix formula has no duplicate in all the veterinary field.

Active ingredients:

Bis (diethoxyphosphinothioyl) disulfide..	7.63%
(Diethoxyphosphinothioyl) (ethoxy) (2-propoxy) (phosphinothioyl) disulfide	10.54%
Related disulfides.....	6.83%
Petroleum solvent.....	69.00%
Inert ingredients, including perfume.....	6.00%

Supplied in pints and gallons.

Fort Dodge Laboratories, Inc., Fort Dodge, Iowa

DOCTOR.. MASTITIS CONTROL

Calls for Early Detection

So that you may be better acquainted with the **MERITS** of our Accuracy Attested — The KO-EX-7 Brom Thymol Mastitis Detectors with the green spots which tell the Degree of Severity of the infection, we will gladly mail you a full sized box FREE upon request. Write today. Sold all over the World.

BEST BY TEST

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STERLING RESEARCH CORP.

Dairy Div. VM Sidway Bldg. Buffalo 3, N. Y.

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LAMOTTE CHEMICAL

Specialists in

Simplified Blood Chemistry Test Equipment

Send for Illustrated Blood Chemistry Handbook

LAMOTTE CHEMICAL PRODUCTS CO.
Chestertown, Maryland, U.S.A.
Dept. VM

Government Pay Hike

The United States Civil Service Commission has approved the Department of Agriculture's request to raise the entrance grade for veterinarians without experience to GS-9. This has the effect of enabling newly graduated veterinarians to qualify for positions in the federal service at an entrance salary of $6,135. per annum, the second step of the grade GS-9 salary scale. The entrance grade and salary for such veterinarians who have not had a year or more of professional veterinary experience following graduation have heretofore been grade GS-7, at $5,430. per annum.

Cummings to Pitman-Moore Post

Harold F. Cummings joined Pitman-Moore Company as a vice president September 1. Cummings has been with Vitamerican Corporation, Haledon, New Jersey, since 1948 and has been the firm's vice president in charge of sales. A native of Laramie, Wyoming, Mr. Cummings is a graduate of the University of Wisconsin.

CURTS **VitamADE®** CURTS

HIGH POTENCY INJECTABLE VITAMIN COMBINATION ESPECIALLY DESIGNED FOR THE NEWBORN

Each cc. contains { Vitamin A — 100,000 Units; Vitamin D_2 — 100,000 Units; Vitamin E — 10 mg.

Indicated in conditions of weakness, unthriftiness, emaciation and other manifestations of avitaminosis in calves, colts, lambs, baby pigs, puppies and kittens.

Also useful in prepartum "downers,"

Dose — 1 to 3 cc. — daily for 2-3 days.

Packages: 30 cc. diaphragm stoppered vial; 6 vials in two-tone plastic box

Write for literature

order from your nearest CURTS distributor or direct

CURTS Laboratories, Inc.

Feature Formulations — for Veterinarians — Since 1918

71 Central Avenue Kansas City 18, Kansas

Selling veterinarian services to the farmer (No. 2 of a series)

"partners in profit"

. . . You and the Livestock Farmer—Another full page advertisement by Research Laboratories, Inc. farm writer, Fred Wenright and aimed squarely at selling the "Partners in Profit" idea to livestock farmers all over the nation. It dramatically tells the profit story behind a working relationship between one farmer and his veterinarian.

We recommend "Partners in Profit" as must reading for you and your clients. Reprints are available, order now.

Research Laboratories, Inc.

Saint Joseph Missouri

Partners in Profit
How one farmer works with his veterinarian
Know-how and hard work, plus regular professional advice from a veterinarian, have realized increased income for this balanced farm operation.

Appearing in The Farm Quarterly Magazine, Autumn 1959 issue. Read nationally by over 225,000 subscribers.

Research Laboratories sells its products only to graduate veterinarians.

New, convenient, efficient way to treat porcine necrotic enteritis due to Salmonella choleraesuis

CLINICAL RESULTS: Field tests[1,2,3,4] indicate perorally administered FURACIN to be safe and specific for uncomplicated Salmonella infections and necrotic enteritis of swine and beneficial in other nonspecific enteric conditions of swine. Controlled laboratory studies[5,6] demonstrate that FURACIN Water Mix in drinking water for 7 consecutive days prevents mortality and aids in maintaining normal growth of pigs infected 2 days prior to treatment.

METHOD: Add FURACIN Water Mix to the drinking water in proportions of 330 Gm. (1 carton) to each 36 gallons. Continue medicated water for at least 7 days.

FURACIN®

BRAND OF NITROFURAZONE

WATER MIX

SUPPLIED: Carton of 330 Gm. Available from your professional veterinary distributor.

REFERENCES: 1. Vickers, C. L.: Personal communication. 2. Filion, R., and Trepanier, M.: Personal communication. 3. Lannek, N., and Brag, S.: Vet. Med. 49:75-78 (Feb.) 1954. 4. Felgate, C. A., and Swann, H. C.: Vet. Rec. 68:259-262 (May 5) 1956. 5. Guthrie, J. E.: Vet Med. 47:307-314 (Aug.) 1952. 6. Guthrie, J. E.: Personal communication.

NITROFURANS —a *unique* class of antimicrobials—neither antibiotics nor sulfonamides

EATON LABORATORIES, NORWICH, NEW YORK

Sometimes the Odds Aren't Even!

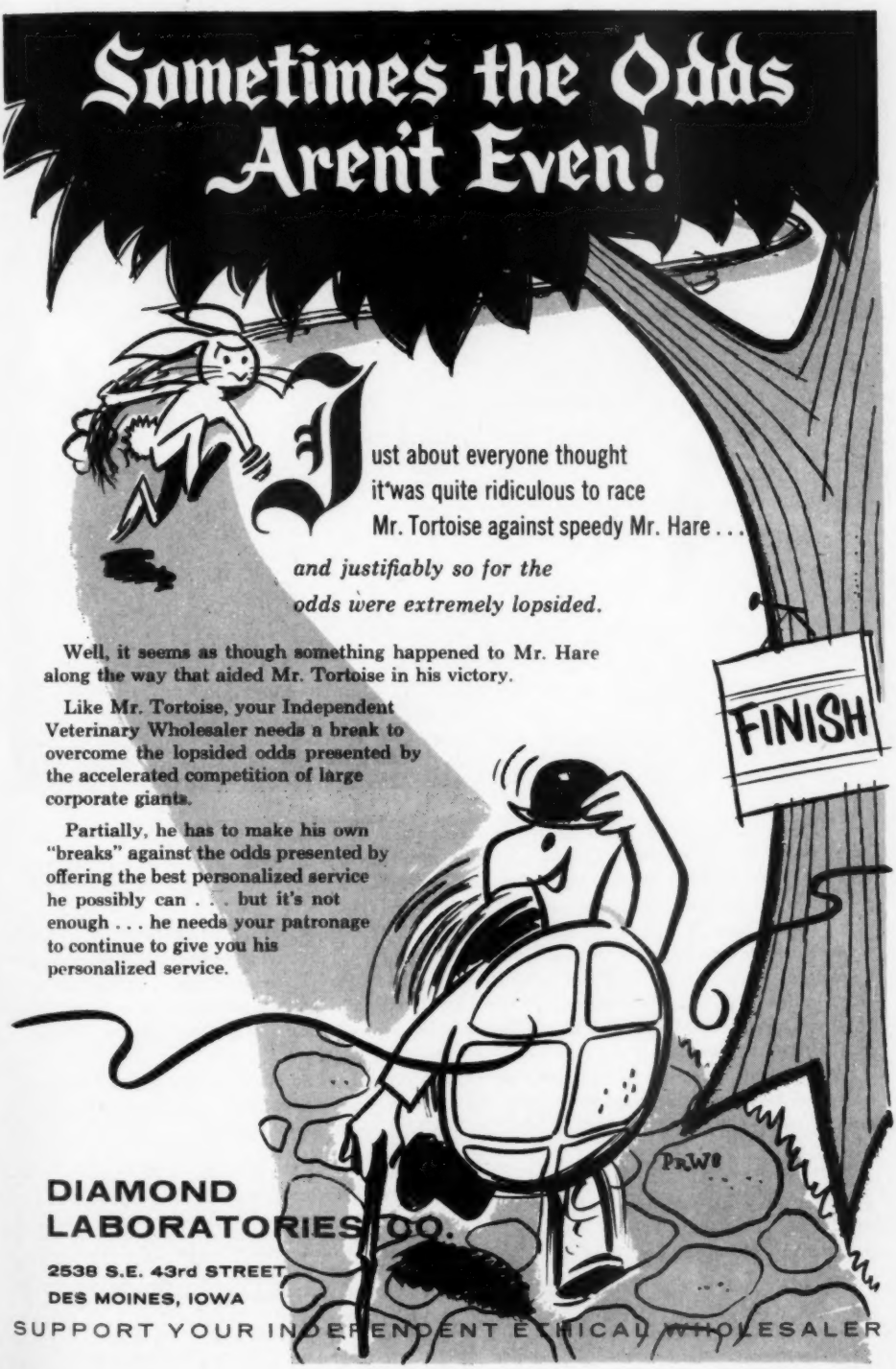
Just about everyone thought it was quite ridiculous to race Mr. Tortoise against speedy Mr. Hare . . .

and justifiably so for the odds were extremely lopsided.

Well, it seems as though something happened to Mr. Hare along the way that aided Mr. Tortoise in his victory.

Like Mr. Tortoise, your Independent Veterinary Wholesaler needs a break to overcome the lopsided odds presented by the accelerated competition of large corporate giants.

Partially, he has to make his own "breaks" against the odds presented by offering the best personalized service he possibly can . . . but it's not enough . . . he needs your patronage to continue to give you his personalized service.



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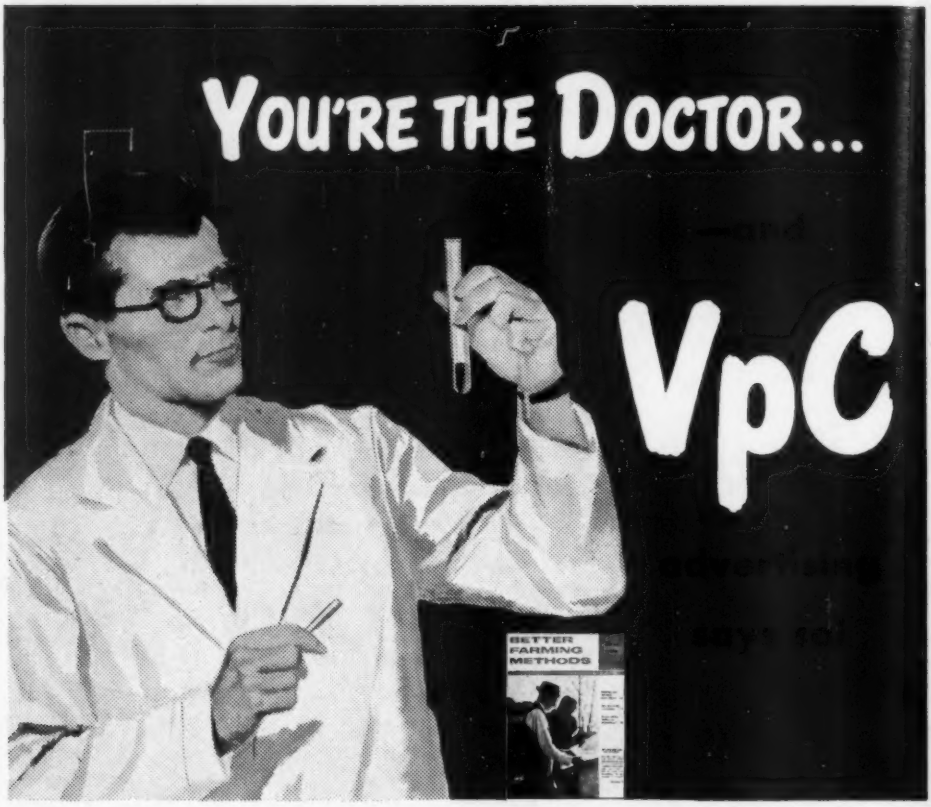


Correctly diagnosing a nutritional imbalance is a specialized field. Yet many feeders, when faced with symptoms of dietary deficiencies, seek advice from their local Vo-Ag man, county agent, or other leading agricultural expert—men of the soil whose training and experience do not prepare them for such a specialized service.

Vitamineral is currently campaigning for *you* with big color advertisements in *Better Farming Methods*—read by thousands of these leading agricultural advisers. We are calling a spade a spade. *No one* is more trained than you to recognize the nutritional limitations of crops grown in your area. *No one* is more qualified than you to recommend a correctly-balanced, productive feed formula combining home grown grains and highest-quality vitamin and mineral supplements.

We want ag leaders in your area to recommend *you* for advice on every specific feeding program. And we're backing you up with the finest vitamin and mineral supplements obtainable . . . to be fed *only* according to your professional recommendations.

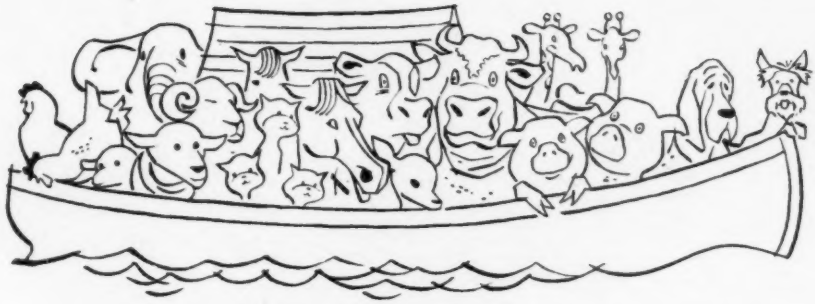
For over 40 years, highest-quality Vitamineral supplements have been available only through veterinarians.

VETERINARIAN'S FORMULA FEED MANUAL

Handy reference guide for both veterinarian and client. NEW, bigger, (56 pages) fully illustrated—contains dozens of proved formulas for low-cost feeds utilizing home grown grains . . . suggestions on management, sanitation, deficiencies. Send for your free copies *now!*

VITAMINERAL PRODUCTS CO., PEORIA, ILLINOIS

Via-D-Mineral . . . Con-o-mineral . . . Viamineral . . . Ribad . . . Via-Z-Mineral . . . VpC Dog Food Supplement



Rapid Bactericidal Action in All Species

The synergism of Neomycin and Polymyxin B extends the bacteri*cidal* action well beyond the limits of either antibiotic. The broad spectrum of effectiveness has been reported authoritatively in numerous published clinical studies.[1,2,3]

Because Daribiotic is bacteri*cidal*, resistant organisms have little opportunity to develop. Convenient dosage forms for the treatment of small and large animals broaden the usefulness of Daribiotic.

DARIBIOTIC®

NEOMYCIN-POLYMYXIN B*

IN PRACTICAL DOSAGE FORMS

DARIBIOTIC Injectable—for prompt treatment of bacterial infections.
DARIBIOTIC Mastitis Infusion—in 7.5-cc. tubes and 100-cc. vials.
DARIBIOTIC-AH—12-cc disposable syringe for mastitis infusion.
DARIBIOTIC Tablets—for control of intestinal infections.
DARIBIOTIC Soluble—convenient oral administration in liquids for intestinal infections.

*U.S. Patent No. 2,565,057

1. Barr, F.S., Carman, P.E. and Harris, J.R.: Synergism and Antagonism in Antibiotic Combinations; Antibiotics and Chemotherapy; 4:818 (1954).
2. Baker, W.L.: Clinical Use of Injectable Neomycin and Polymyxin B; Veterinary Medicine, 53 (1959): 275.
3. Barr, F.S., Harris, J.R. and Carman, P.E.: Intramuscular Treatment of Staphylococcic Mastitis with Neomycin Sulfate and Polymyxin B Sulfate; J.A.V.M.A., 132 (1958): 110.

Write for literature and reprints

THE S. E. MASSENGILL COMPANY
VETERINARY DIVISION
Bristol, Tennessee

when

urinary

tract

infection

is suspected

FURADANTIN® ORA-BOLS™ veterinary

brand of nitrofurantoin

new, exclusive veterinary dosage form

pleasant tasting ▪ easily administered ▪ readily retained

In small-animal urinary tract infections, FURADANTIN swiftly achieves high bactericidal concentrations in the urine, and in a high percentage of cases eliminates incontinence, dysuria, frequency, and straining. Of 32 dogs and cats recently treated,[1] 29 showed rapid clinical improvement. Often, there is marked improvement by the 4th day and complete recovery in 7 to 14 days.[2]

In canine tracheobronchitis, FURADANTIN given for 5 days stopped the coughing in 95% of 75 cases; in some dogs, complete symptomatic relief was gained in 48 hours.[3]

COMPOSITION:

Each FURADANTIN ORA-BOLS provides FURADANTIN 50 mg. in an excipient containing dextrose.

SUPPLIED:

Bottle of 100 scored 50 mg. ORA-BOLS. FURADANTIN also is available as: 10 mg. and 100 mg. scored tablets, bottles of 100, and Oral Suspension containing 5 mg. FURADANTIN per cc., bottle of 60 cc.

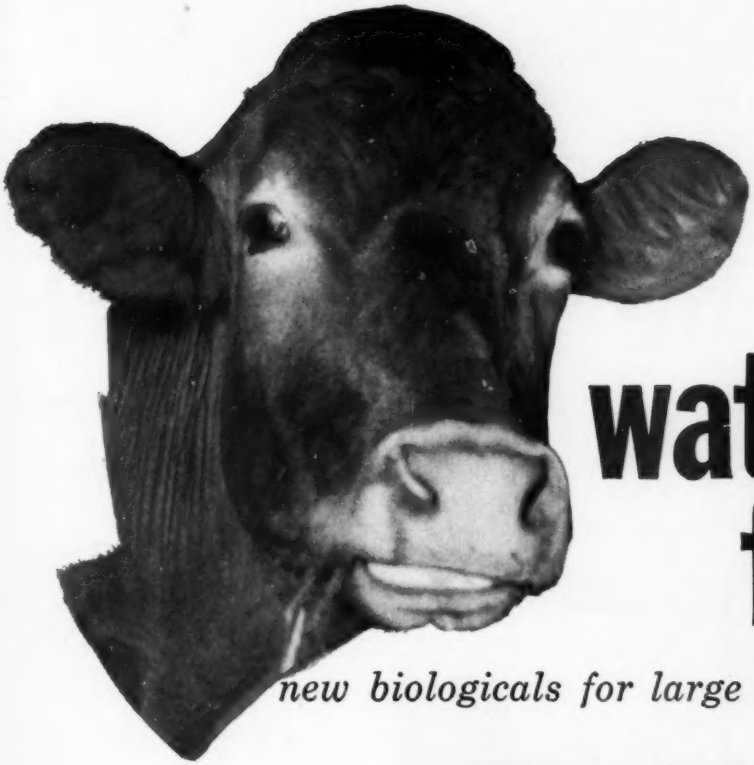
REFERENCES: 1. Mosier, J. E., and Coles, E. H.: Vet. Med. 53:649 (Dec.) 1958. 2. Belloff, G. B.: Calif. Vet. 9:27 (Sept.-Oct.) 1956. 3. Mosier, J. E.: Vet. Med. 52:445 (Sept.) 1957.

Available through your professional veterinary distributor.

NITROFURANS—a *new* class of antimicrobials—neither antibiotics nor sulfonamides

ORA-BOLS T.M. is the Eaton trade mark for small, bolus-shaped tablets.

EATON LABORATORIES, NORWICH, NEW YORK



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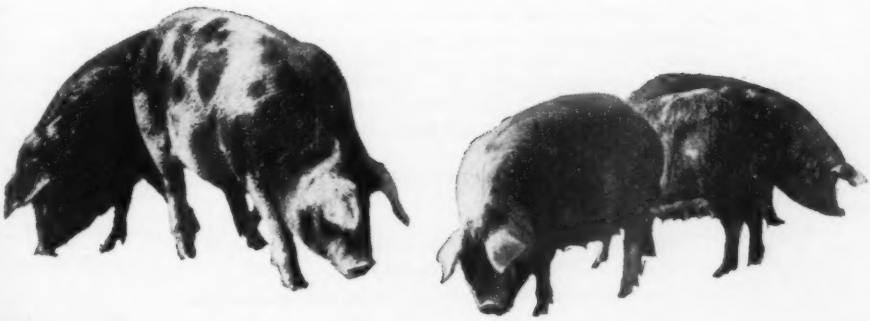
new biologicals for large animals
by

FROMM LABORATORIES, INC.
GRAFTON, WISCONSIN, U.S.A.

THE FINEST IN VETERINARY BIOLOGICALS
SOLD TO GRADUATE VETERINARIANS ONLY



NEW!

Hemostop*

lyophilized

prompt control of bleeding

The preoperative use of Hemostop facilitates any surgical procedure where bleeding is a problem. Hemostop—for prompt, safe control of bleeding in—

spaying
castrating
mastectomy
eye surgery
removal of anal glands
dental extractions
ear trimming
excising neoplasms
tonsillectomy
fractures, internal bleeding

—as well as other conditions where the integrity of the vascular bed is impaired.

In recommended dosage there are no contraindications.

For intramuscular injection. Each 5 cc. vial contains adrenochrome isonicotinic acid hydrazone, 25 mg., present as sodium 3 hydroxy 2 naphthoate complex. Diluent: water USP, 5 cc., benzyl alcohol, 2% W/V.

RECOMMENDED DOSAGE: Small animals, 0.25 cc. to 1 cc. Foals, 2 cc.; Horses, 5 cc.

Restricted to sale by or on the order of a licensed veterinarian.

THE S. E. MASSENGILL COMPANY

Veterinary Division

Bristol, Tennessee • New York • San Francisco • Kansas City

*U.S. Pat. 2,728,722

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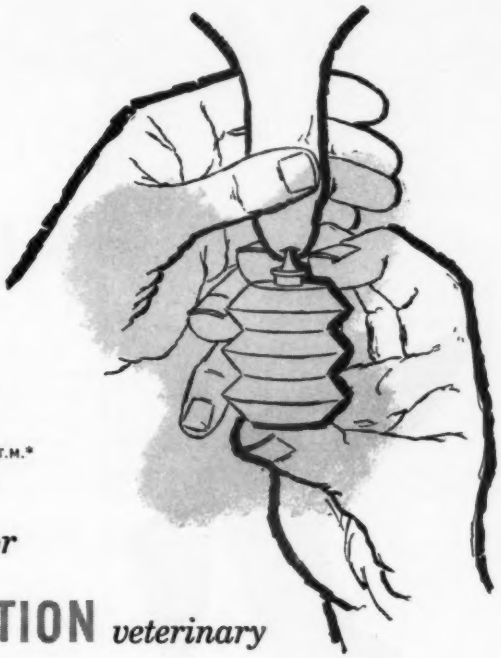


for **MASTITIS** *of*

dry and lactating cows

NEW SQUEEJET[T.M.*]

single-dose dispenser for

FURACIN® SOLUTION *veterinary*

brand of nitrofurazone

- delivers one full dose
- is discarded after using
- saves time
- is convenient, especially when a number of cows are to be treated
- unique package

*design patented

FURACIN has been shown to be strikingly effective in controlling mastitis under field conditions.[1,2] Of 7,123 lactating cows with acute mastitis, fair to excellent results were obtained in 5,597 (78%). Of 3,418 dry cows which had had mastitis during their previous lactating period, fair to excellent results were obtained in 3,104 (90%).

SUPPLIED A water-miscible liquid of FURACIN 0.2% in polyethylene glycol and water. Single-dose SQUEEJET disposable dispenser of 30 cc. Still available, bottles of 500 cc. with rubber stopper and 1 gal.

1. Mires, M. H., and Chadwick, R. H.: Vet. News **10**:3 (Jan.-Feb.) 1947. 2. Mires, M. H.: J. Am. Vet. M. Ass. **117**:49 (July) 1950.

All Eaton Veterinary Specialties Are Available Through Your Professional Veterinary Distributor.

NITROFURANS—a *new* class of antimicrobials— neither antibiotics nor sulfonamides

EATON LABORATORIES, NORWICH, NEW YORK

TO TREAT OR PREVENT SURFACE INFECTIONS

FURACIN®

brand of nitrofurazone

bactericidal against a wide range of gram-negative and gram-positive organisms / negligible development of bacterial resistance / nontoxic to mammalian tissue / no bacterial cross-resistance / no cross-sensitization to other agents / stable and effective in presence of blood, pus, milk, serum

LE FURACIN soluble powder veterinary

in bacterial infections of the eye and ear, operative wounds, burns

Formula and Supply: FURACIN 0.2% in polyethylene glycol.
Plastic "puff" bottle of 10 Gm.

SPREAD FURACIN dressing veterinary
dressing veterinary with anesthetic

in wounds, burns, ulcers, pyodermas, osteomyelitis of compound fractures, secondary bacterial infections

Formulas and Supply: FURACIN 0.2% in a water-soluble base. *Jars of 5 oz. and 1 lb.* FURACIN Dressing Veterinary with Anesthetic contains butacaine sulfate 0.5%. *Tube of ½ oz. and jar of 1 lb.*

SPRAY FURACIN solution veterinary

especially useful for treating painful lesions —can be applied directly or with atomizer

Formula and Supply: FURACIN 0.2% in a water-miscible liquid of polyethylene glycol and water. *Bottles of 1 pint, 1 gal., and 500 cc. with rubber stopper.*

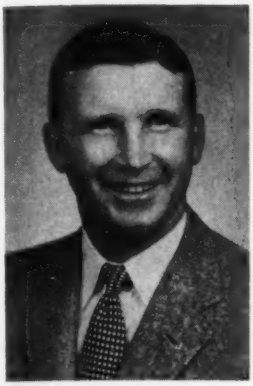
Available from your professional veterinary distributor

NITROFURANS—a *unique* class of antimicrobials—neither antibiotics nor sulfonamides

EATON LABORATORIES, NORWICH, NEW YORK

To Baldwin Laboratory Post

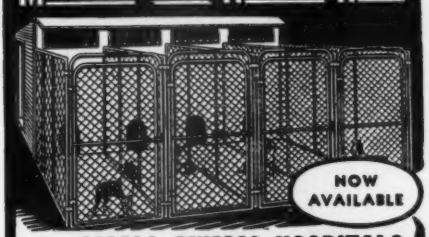
Dr. John M. Aiken has been named executive vice president of Baldwin Laboratories, according to company announcement.



Dr. John M. Aiken

Doctor Aiken is a native Kansan. After being discharged from the U.S. Air Force, he returned to complete and receive his B.S. in Agriculture and D.V.M. from Kansas State University in 1949. He established his practice in South Sioux City, Nebraska, in June of 1949, and sold his interests to his partner and associate upon joining Baldwin Laboratories, Inc.

MASON'S *New* KENNEL RUNS



NOW AVAILABLE

For SMALL ANIMAL HOSPITALS

Quickly Erected - NO POSTS REQUIRED

Can be set on concrete or wood floors or directly upon the ground, joining to, or independent of Building. Composed of strong, self-supporting Fence sections and Gate Units with GATES BUILT-IN and Lockable Latches.

FREE CATALOG

Send for Free Catalog with Low Direct Factory Prices of Kennel Fences of all kinds, Kennel Doors, Cages and Hospital Equipment.

THE MASON FENCE CO., Box 77, LEESBURG, OHIO

SUN-RAY

The "BIG 3" SERIES of CLIPPER BLADE GRINDERS

will save you time and money too!

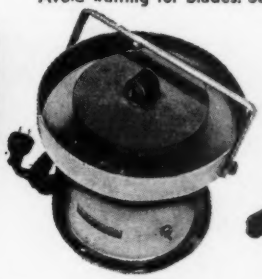
Sun Ray's scientifically designed and engineered grinders assure you of blades correctly ground to professional sharpness every time.

Easy to Use. No previous experience or special skill necessary. Just remove blades from clipper . . . place on grinder — THAT'S ALL! Avoid waiting for blades. Save on periodic grinding costs.

the ROYAL

A complete grinding ensemble . . . . the ultimate in versatility — HONES, GRINDS, SHARPENS & POLISHES (note protective guard & adjustable grinding rail)

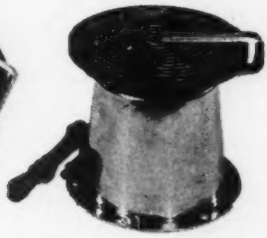
Royal 7—7" Metal Disc & Stone Wheel



the IMPERIAL

Fast grinding stone wheel that guarantees super sharp blades every time (note protective guard ring and adjustable grinding rail)

Imperial 7-7" Stone wheel



the REGULAR

The economy model for excellent honing and polishing results

Model C-7" Metal Disc

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NEW Patent BLADE HOLDER with every Sun Ray grinder

Simplifies grinding — saves wear — prevents abrasions

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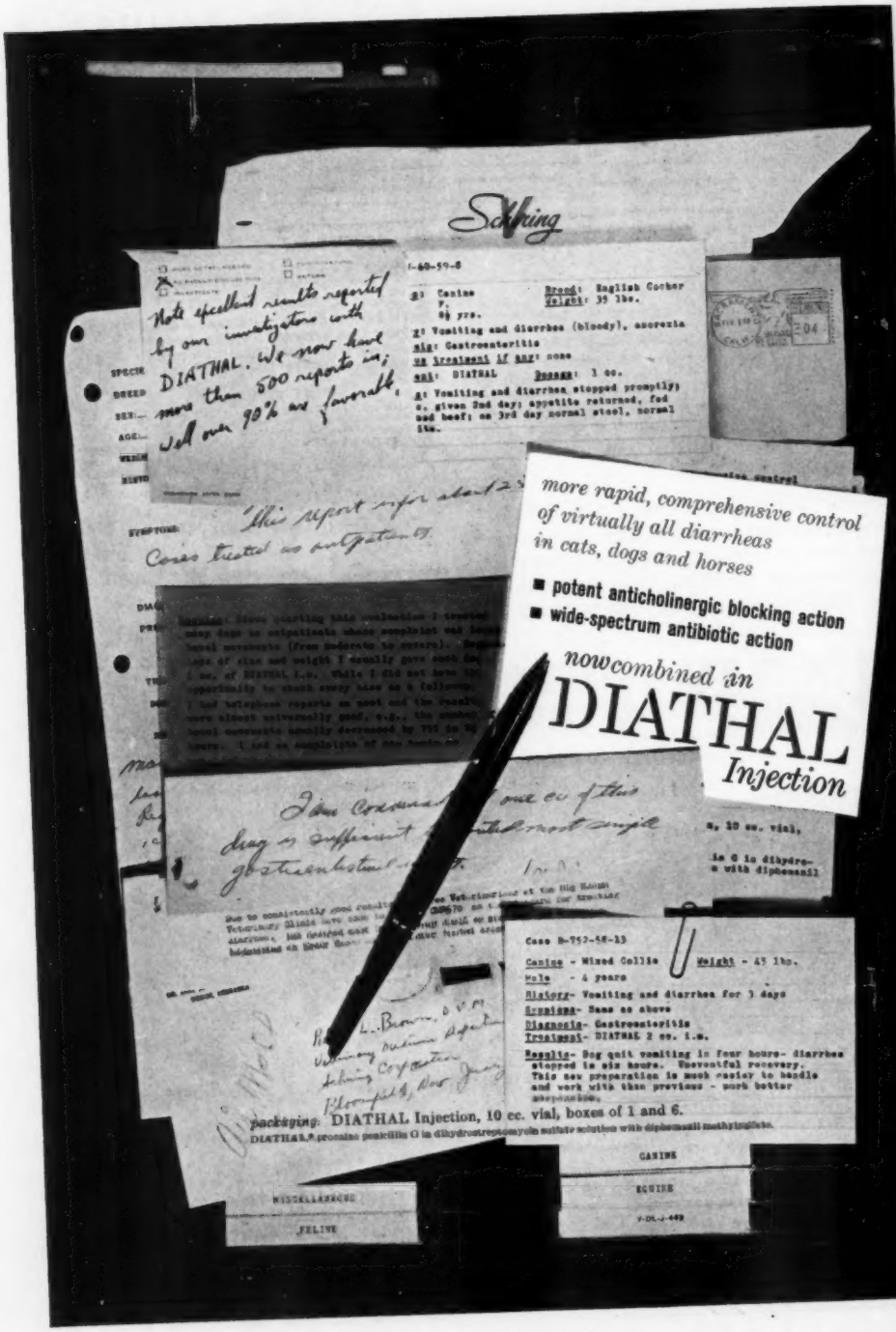
2404 Fuller St., New York 61, N. Y.


Note spelled results reported by our investigators with DIATHAL. We now have more than 500 reports in; tell over 90% are favorable.
more rapid, comprehensive control of virtually all diarrheas in cats, dogs and horses
■ potent anticholinergic blocking action
■ wide-spectrum antibiotic action
now combined in
DIATHAL
Injection
packaging: DIATHAL Injection, 10 cc. vial, boxes of 1 and 6.
DIATHAL® procaine penicillin G in dihydrostreptomycin sulfate solution with diphemanil methylsulfate.
CANINE
EQUINE
FELINE
MISCELLANEOUS

QUICK, EFFECTIVE TREATMENT FOR TOPICAL INFECTIONS

KERASPRAY®

Keraspray provides 4 potent antibacterials, plus a local anesthetic. This broad antibacterial activity makes it especially useful as a topical dressing following closure of surgical incisions, dehorning and castration.

In the easy-to-use plastic insufflator, Keraspray offers effective therapy for infected wounds, ear and eye infections—specifically keratitis.

in large AND small animals

Each Gm. contains:

Neomycin sulfate	0.25%
Phenylmercuric nitrate	0.005%
Sulfanilamide	86.25%
Sulfisoxazole	10.0%
Tetracaine hydrochloride	0.5%

Supply: 5 Gm., 14 Gm. and 30 Gm. plastic insufflators.

ONE PUFF IS USUALLY ENOUGH

THE S. E. MASSENGILL COMPANY

Veterinary Division

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SAMCO
Gas Fired
CREMATORY DESTRUCTOR
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Engineered special for the Veterinary Practitioner

ANIMAL CARCASS CREMATION

RAPID DISPOSAL
Animal carcasses, wet and dry cage papers, amputations, feces, entrails, garbage.
•
CLEAN AND ORDERLY PREMISES
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CAPACITY 8 BU.
FEED DOOR 21" x 19"
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100% SAFETY AUTOMATIC main burner with pilot light and timer shut off
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Great heat and firepower
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Larger Sizes Available
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MANY IN USE
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Investigate unique purchase plan for great saving.

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511 North State Street — Syracuse 3, N. Y.

Kingrey Assumes ISU Duties

Dr. Burnell W. Kingrey, professor and head of the department of veterinary medicine and surgery in the College of Veterinary Medicine at Iowa State University of Science and Technology has been given an additional duty. As of July 1 he was also made Director of Veterinary Clinics. At the same time, within the department of veterinary medicine and surgery Dr. D. L. Baker was made chairman of the small animal section, Dr. R. L. Lundvall became chairman of the large animal section, and Dr. Kenneth Preston was appointed chairman of the ambulatory clinic.

Pantera Named to Gaines Post

Charles N. Pantera has been designated as manager of Gaines Professional Sales, according to a company announcement.

Pantera's special responsibility will be the Gaines Professional Feeder Plan recently introduced for breeding, boarding and training kennels, veterinary establishments, humane society shelters, etc.

for Small and Large Animals

Metrazol

A quick-acting, powerful Antianesthetic and Respiratory — Circulatory Stimulant

Prevents and overcomes respiratory and circulatory inadequacy prior to or during surgery. Hastens post-operative recovery. Overcomes shallow respiration and sluggish circulation in old, toxic and debilitated animals when given orally.

Dose: Small animals ½ to 3 cc. METRAZOL by injection, as necessary.
One METRAZOL tablet orally three or four times a day.
Large animals 10 to 25 cc., intravenously, repeated as required.

Available in: Ampules, (100 mg. per cc.) 1 cc., 6's and 100's.
Sterile Vials (100 mg. per cc.) 30 cc. and 100 cc.
Oral Tablets, 0.1 Gm. (1½ grs.) each, 100's, 500's and 1000's.

Metrazol®, brand of pentylenetetrazol, E. Bilhuber, Inc.

KNOLL PHARMACEUTICAL COMPANY — ORANGE NEW JERSEY

Cyanamid reports to the veterinarian

Cyanamid has a file cabinet filled with testimonials on AUREOMYCIN® Crumbles.

Case histories of livestock men who use them and like them.

Many of these men say they tried Crumbles on the advice of their veterinarian.

These practitioners are recommending preventive programs... keep them well rather than get them well.

AUREOMYCIN Crumbles fit right into this type program.

A fifty lb. bag in the back of the car can add to the service you render on any farm call.

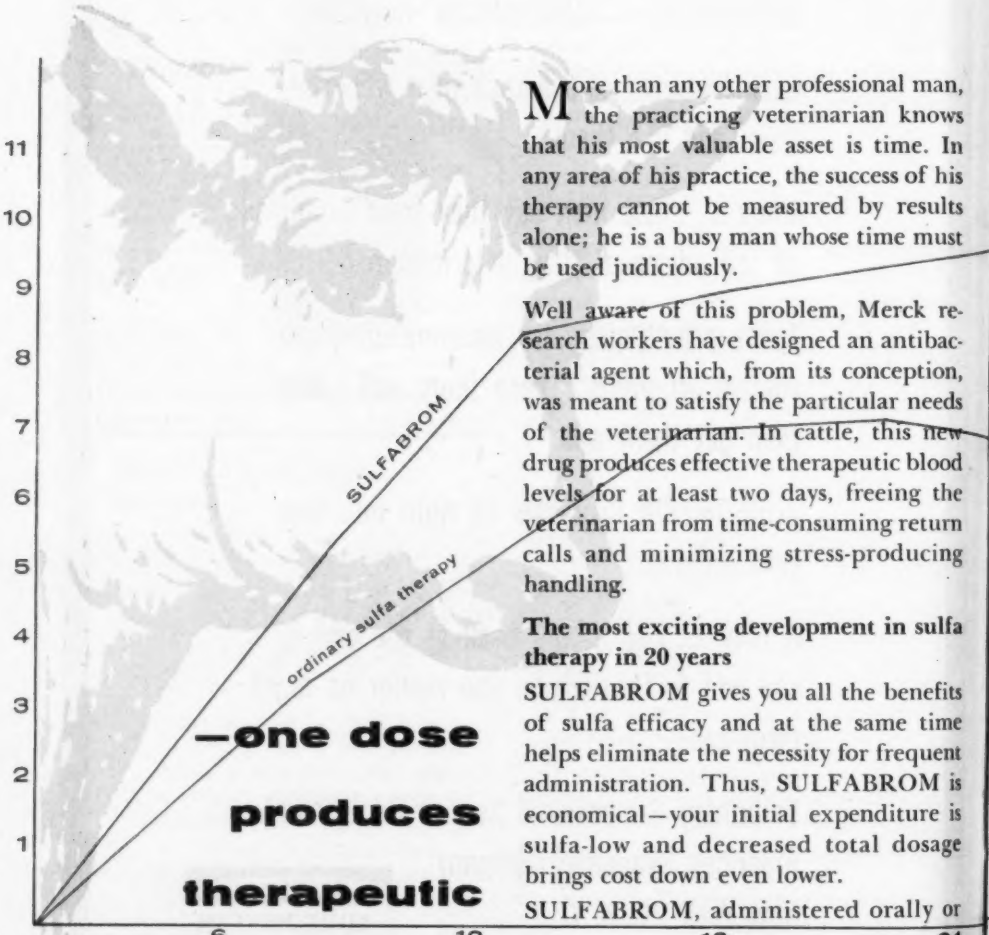
Veterinary Professional Service Department
American Cyanamid Company
New York 20, N. Y.

AUREOMYCIN® Chlortetracycline

CYANAMID
AUREOMYCIN
CRUMBLES

SULFA

...for a new



More than any other professional man, the practicing veterinarian knows that his most valuable asset is time. In any area of his practice, the success of his therapy cannot be measured by results alone; he is a busy man whose time must be used judiciously.

Well aware of this problem, Merck research workers have designed an antibacterial agent which, from its conception, was meant to satisfy the particular needs of the veterinarian. In cattle, this new drug produces effective therapeutic blood levels for at least two days, freeing the veterinarian from time-consuming return calls and minimizing stress-producing handling.

The most exciting development in sulfa therapy in 20 years

SULFABROM gives you all the benefits of sulfa efficacy and at the same time helps eliminate the necessity for frequent administration. Thus, SULFABROM is economical—your initial expenditure is sulfa-low and decreased total dosage brings cost down even lower.

SULFABROM, administered orally or

—one dose produces therapeutic blood levels lasting up to 48 hours in cattle

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ABROM*

...concept in sulfonamide therapy

SULFABROM is a bromine-substituted sulfamethazine developed by Merck research workers. This new antibacterial agent is the only sulfa product available *exclusively* to veterinarians.

intraperitoneally to cattle, produces effective blood levels lasting up to 48 hours—frequently long enough to eliminate *any* repetition of dosage.

SULFABROM—quickly absorbed, slowly excreted

Although SULFABROM is notable for producing effective levels in rapid time, once it has entered the blood stream its speed of action slows down considerably. SULFABROM is excreted very slowly; this accounts for its long-lasting effect. In cattle, detectable amounts may be present in the urine for as long as six days. Blood levels remain high, sometimes for as long as 53 to 60 hours. And, because it is excreted so slowly, seldom is the amount of SULFABROM passing through the urinary tract ever large enough to cause crystalluria.

SULFABROM—effective against a broad range of infection

By maintaining a high sulfonamide level in the tissues, SULFABROM minimizes the emergence of resistant strains of most pathogens. SULFABROM exerts its antibacterial effect at the cellular level long enough to combat effectively both gram-negative and gram-positive organisms including those responsible for:

calf diphtheria "recovery in 48 hours";
acute septic mastitis "uneventful recovery";
metritis "back on feed and eating normally" in two days;
foot rot "in 48 hours the cow was able to stand and started to eat";
pneumonia "in five days' time this calf was back to normal";[1]
as well as *scours*, winter dysentery, coccidiosis, shipping fever, listerellosis and miscellaneous infectious conditions, such as peritonitis and infected wounds.

SULFABROM—single-dose sulfa therapy available exclusively to veterinarians

In sum, SULFABROM represents the very latest advance in sulfa therapy. Effective against a full range of infectious diseases, economical to use by any standards, SULFABROM is your answer to the pressing problem of repeat calls and handling time in the treatment of almost any infection.

30 36 42 48

DOSAGE *(in cattle)*

SULFABROM Boluses
60-90 mg. (1.0-1.5 grains)/lb. of body weight, orally—for sustained levels

SULFABROM Buffered Powder
15-30 mg. (0.25-0.5 grains)/lb., intravenously—for *immediate* levels
30-60 mg. (0.5-1.0 grains)/lb., intraperitoneally—for *rapid*, sustained levels
60-90 mg. (1.0-1.5 grains)/lb., orally, as a drench—for *convenient* levels

Supplied as
SULFABROM Buffered Powder—1-lb. bottles
SULFABROM 15 Gm. Boluses—packages of 5 and 50
SULFABROM 4 Gm. Boluses—packages of 5 and 50

MERCK & CO., INC.
Chemical Division
Rahway, New Jersey

MERCK

VETERINARY

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B-P
HALIMIDE*
the CONCENTRATE with the TWOFOLD ACTION
For Instrument Disinfection

BACTERICIDAL
—when diluted with water (except the tubercle bacillus)
TUBERCULOCIDAL *also*—
when diluted with alcohol

**Trademark of Bard-Parker Co., Inc.*

***PLUS**—these other important advantages . . .*

NON-CORROSIVE
—No anti-rust tablets to add.
STABLE
—Need not be changed frequently.
ECONOMICAL
—1 oz. makes 1 gal. of solution.

Bard-Parker HALIMIDE is the result of years of research to develop a concentrate combining maximum bactericidal potency and trouble-free performance. IT'S ECONOMICAL . . . *any way you look at it!*

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B-P INSTRUMENT CONTAINER No. 300
Of stainless steel and PYREX glass with airtight cover. Ideal for use with B-P HALIMIDE.

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DANBURY, CONNECTICUT
A DIVISION OF BECTON, DICKINSON AND COMPANY

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Veterinary Calendar

Sep. 21-22 **New Mexico Veterinary Medical Association,** annual meeting. Western Skies Hotel, Albuquerque, New Mexico. Dr. E. R. Leslie, Carlsbad, New Mexico, secretary.

Sep. 28-29. **Annual Conference for Veterinarians.** Georgia Coastal Plain Experiment Station, Tifton, Georgia.

Oct. 3-5. **Florida Veterinary Medical Association.** Hillsborough Hotel, Tampa, Florida.

Oct. 7-9. **Purdue University, Conference for Veterinarians.** Purdue University, Lafayette, Indiana.

Oct. 15-16. **Eastern Iowa Veterinary Association,** 46th annual meeting. Hotel Roosevelt, Cedar Rapids, Iowa. Dr. Charles B. Thayer, Iowa City, Iowa, secretary.

Oct. 18-20. **Texas Veterinary Medical Association.** Hotel Windsor, Abilene, Texas. Paul B. Blunt, 710 Maverick Building, San Antonio, Texas, executive secretary.

Oct. 24. **Iowa State College Veterinary Homecoming Luncheon.** Veterinary Courtyard, Iowa State College, 11:00 a.m.

Oct. 29-31. **Animal Care Panel,** annual convention. Sheraton Park Hotel, Washington, D. C. Dr. William I. Gay, 2101 Constitution Avenue, N.W., Washington 25, D. C., chairman.

Nov. 2-3. **University of Missouri,** 35th annual veterinary conference. School of Veterinary Medicine, Columbia, Missouri. Dr. Cecil Elder, chairman.

Nov. 30—Dec. 1. **Midwest Veterinary Nutrition Conference.** President Hotel, Kansas City, Missouri. Mr. Lloyd Larson, Midwest Feed Manufacturers Association, 20 W. 9th Street, Kansas City 5, Missouri, executive secretary.

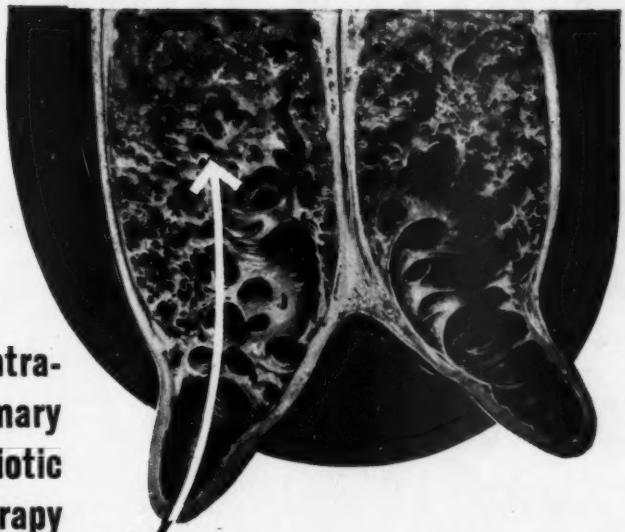
Dec. 7-8. **Kentucky Veterinary Medical Association,** winter meeting. Sheraton-Seelbach Hotel, Louisville, Kentucky. Dr. L. S. Shirrell, 545 East Main, Frankfort, Kentucky, secretary.

Dec. 15-18. **United States Livestock Sanitary Association,** 63rd annual meeting. Sheraton-Palace Hotel, San Francisco, California. Dr. James E. Stuart, 1220 N Street, Sacramento 14, California, chairman.

Jan. 26-27. **Short Course for Louisiana Veterinarians.** Pleasant Hall, L.S.U. Campus, Baton Rouge, Louisiana. Dr. R. B. Lank, Department of Veterinary Science, LSU, chairman.

Jan. 25-27. **Minnesota State Veterinary Medical Society.** Hotel St. Paul, St. Paul, Minnesota. B. S. Pomeroy, College of Veterinary Medicine, St. Paul 1, Minnesota, secretary-treasurer.

Feb. 1-2. **Oklahoma Veterinary Medical Association.** Biltmore Hotel, Oklahoma City, Oklahoma. Dr. W. F. Irwin, 3550 South Peoria Avenue, Tulsa, Oklahoma, secretary.



intra-mammary antibiotic therapy that reaches the site of infection

LIQUAMAST*

oxytetracycline HCl

FOR MASTITIS

Liquamast is a liquid preparation of the broad-spectrum antibiotic, oxytetracycline, highly effective against all of the most common organisms responsible for bovine mastitis.

Liquamast is completely soluble in milk, thereby providing maximum antibiotic concentrations therein.

Liquamast diffuses readily, via the milk, to the sites of infection in the upper portions of the mammary gland, whereas oil or ointment type vehicles have a tendency to settle in the main duct of the udder. In extremely deep-seated, chronic cases, Liquamast is a good adjunct to systemic oxytetracycline therapy.

Supply: 1/2 oz. tubes—426 mg. of oxytetracycline HCl, packaged in a 12-tube carton with one tube squeezer.

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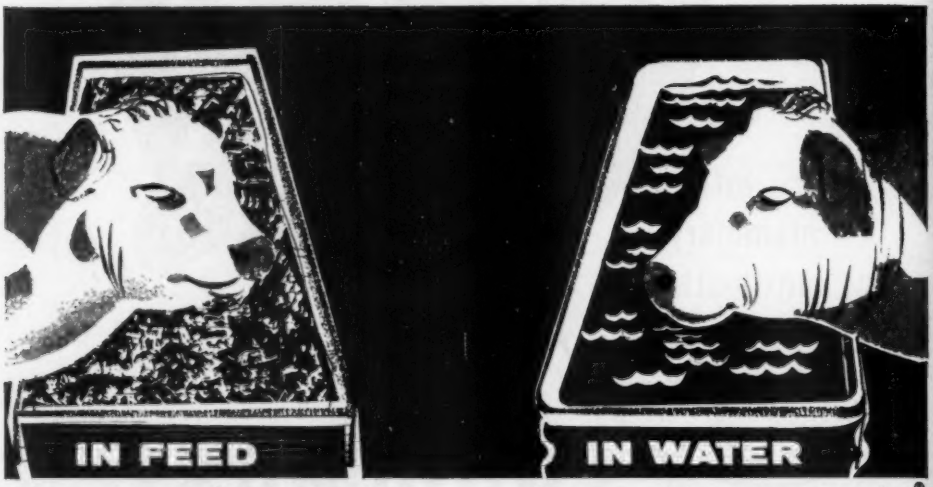
DEPARTMENT OF VETERINARY MEDICINE
Pfizer Laboratories, Division, Chas. Pfizer & Co., Inc.

*TRADEMARK

IN CATTLE DISEASES

- *bacterial scours*
- *respiratory diseases of bacterial origin*
- *shipping fever complex*



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vitamin-enriched therapeutic feed supplement for addition to feeds and premixes.

Available in 5-lb. canisters

Each lb. contains:
25 Gm. oxytetracycline HCl activity
2,000,000 units vitamin A
200,000 units vitamin D_3
2 Gm. riboflavin
4 mg. vitamin B_{12}
expeller soybean oil meal as the diluent, Q.S.

Cosa-Terramycin®

FORTIFIED SOLUBLE POWDER

vitamin-fortified antibiotic soluble powder for dissolving in water or milk substitute.

Available in ¼ and ½-lb. bottles and 5-lb. canisters

Each lb. contains:
25 Gm. oxytetracycline HCl
500,000 I.U. vitamin A
100,000 I.U. vitamin D_3
200 mg. vitamin K
150 units vitamin E
2,000 mcg. vitamin B_{12}
800 mg. riboflavin
4,000 mg. niacinamide
1,500 mg. pantothenic acid

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New Alocine* hog cholera vaccine lets you 'unlax'

This new Alocine hog cholera vaccine really *does* let you relax.

Because Alocine is made in bottles—not in animals—the variabilities of vaccines produced in live hosts are practically eliminated.

Gone are the old 'seven days of suspense' you used to have every time a hog was vaccinated.

Alocine is the *high noon* vaccine. You can ignore the thermometer, vaccinate on hottest days.

Alocine has immunized millions of hogs and everybody is happy, including the hogs.

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*T.M.

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IN THE DAIRY HERD

KETOSOL'S exclusive formula provides effective ketosis therapy

1 **25% Fructose** Converts to liver glycogen rapidly; is readily utilized; does not result in excessive blood levels; is not excreted in urine to the degree or as rapidly as dextrose; does not require endogenous insulin—eliminates insulin rebound problem.

2 **25% Dextrose** supplies carbohydrates at low cost; does not burden the patient with extra energy requirements as do sorbitol, glycerol, sodium acetate, etc.; does not cause metabolic changes as do cortisone or ACTH.

3 **Acetylmethionine** Aids growth, repair and metabolism of all tissues; helps convert dietary protein to tissue protein, improves liver function; promotes hormone production; aids reversal of metabolic trend usually found in ketosis.

4 **Inorganic phosphates** Helps restore normal carbohydrate metabolism, reducing chance of relapse; potassium phosphate aids regaining of normal blood potassium level.

Primarily for ketosis, practitioners also find KETOSOL a valuable supportive therapy in shock. Dosage is 50 to 500 cc for large animals and 10 to 50 cc for small animals, administered intravenously. Supplied In: 12—500 cc vials .

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DELEGON® POWDER IMPROVED

Antiseptic Dressing Powder

AN IMPROVED DUSTING POWDER THAT NOW CONTAINS SULFAMYLON® AND NEOMYCIN.

- **Stimulates healing of superficial wounds and lesions.**
- **Effective against wide range of gram-positive and gram-negative bacteria.**
- **Active in presence of pus and blood.**
- **Destroys certain anaerobic bacteria.**
- **Relatively nontoxic to cellular tissue.**

Supplied in 10 Gm. puffer tubes, boxes of 12.

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Twice the potency–
Half the dosage

when you use-

SERATRATE H.C.

Hog Cholera Antibody-Concentrate

This highly refined, concentrated product brings you many advantages, doctor. SERATRATE will save you time, space, and fatigue. Although it has only half the bulk and weight, SERATRATE provides twice the potency of the older serum.

Use of blood from hyperimmune pigs and removal of shock-producing blood protein lessens chance for serum reaction even when large doses are administered. The smaller dosage also lessens tissue trauma and permits faster handling of more pigs in less time.

SERATRATE is truly the product of choice — a modern refinement for today's busy practitioner. You will appreciate its ease of use, handling, and storage. SERATRATE, like all other CSL products, is available exclusively to veterinarians a all CSL distribution points.

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